WORLD OIL

Established 1916 as THE OIL WEEKLY

Specialized Oil Publications of
THE GULF PUBLISHING COMPANY
Box 2608, Houston (1), Texas

WORLD OIL and The COMPOSITE CATALOG
for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

RAY L. DUDLEY, *President, Publisher*
A. L. BURNS, *General Manager*

EDITORIAL STAFF

WARREN L. BAKER, *Editor*
L. J. LOGAN, *Associate Editor*
ELTON STERRETT, *Engineering Editor*

DISTRICT EDITORS

HENRY OZANNE
250 Park Ave.
New York 17, N. Y.

ANTHONY GIBBON
WILLIAM P. STERNE
Hunt Bldg.
Tulsa 3, Okla.

R. W. BYRAM
Drawer M
Capitol Station
Austin 21, Texas

E. N. TIRATSOO
62 Redcliffe Square,
SW 10
London

BERTRAM F. LINZ
Albee Bldg.
Washington 5, D. C.

GILBERT M. WILSON
W. W. Wilson Bldg.
Huntington Park, Calif.

H. H. KING
W. T. Waggoner Bldg.
Fort Worth 2, Texas

GEORGE O. IVES
WELDON B. HILL
AL REESE
J. E. KASTROP
CECIL SMITH
MARY E. POOLE
3301 Buffalo Drive
Houston 6, Texas

ADVERTISING STAFF

TOM W. NELSON, *Advertising Manager*

NELSON BIGELOW
FRANK VICKREY
250 Park Ave.
New York 17, N. Y.

H. G. FITZPATRICK
332 S. Michigan Ave.
Chicago 4, Ill.

J. W. CURTS
W. W. Wilson Bldg.
Huntington Park, Calif.

ROGER MOTHERAL
1010 Euclid Ave.
Cleveland 15, Ohio

BILL ATCHESON
Hunt Bldg.
Tulsa 3, Okla.

CHARLES WYATT
3301 Buffalo Drive
Houston 6, Texas

CIRCULATION DEPARTMENT

CLINTON S. QUIN, JR., *Manager*

Published every Monday. Single copies 25 cents (except special issues). Subscription price: domestic and foreign, $2 a year; 2 years, $3; 3 years, $4. Advertising rates on application.

Copyright 1947 by The Gulf Publishing Company.

Contents

JULY 21, 1947

VOLUME 126, No. 8

Technical and Feature Articles

RIO GRANDE VALLEY GAS COMPANY'S PIPE LINE SYSTEM *(24th of a series)* 33

OLDS' DECLINE CURVES 34
By E. Russell Lloyd

TORSION BALANCE SURVEYS OF INUNDATED AREAS 38
By K. F. Hasselmann

RECOMMENDATIONS ON U. S. NATIONAL OIL POLICY *(Second of Four Parts)* 43

OIL—ITS ORIGIN AND ACCUMULATION *(Last of two parts)* 48
By Dr. F. M. Van Tuyl and Dr. Ben H. Parker

PRODUCTION HINTS 54

News and Departments

LOOKING AHEAD	4	MARKET TRENDS	58
THE OUTLOOK	23	FIELD OPERATIONS	61
THE CHANGING PANORAMA	25	THE OIL MAN'S CALENDAR	64
THE WEEK'S NEWS	27	EXPLORATORY FAILURES	82
CRUDE PRODUCTION	29	MEN IN THE INDUSTRY NEWS	83
INTERNATIONAL NEWS	31	MANUFACTURERS' NOTES	85
PIPE LINE NEWS	32	SQUEAKS FROM THE BULL WHEEL	87
PATENT ROUNDUP	52	ADVERTISERS' INDEX	88

Precisionbilt FOR DEPENDABILITY

J&L WIRE LINES

PERMASET PRE-FORMED

Drilling lines and sand lines made by J&L give you the dependable service that cuts drilling costs. They are Precisionbilt of J&L Controlled Quality Steel to stand by your crews and equipment for every foot of hole. Specify J&L Precisionbilt Wire Lines for all your rigs.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

THE CHANGING Panorama

Decisions Support Centralized Power

TWO recent Supreme Court decisions, in the California tidelands and the Interstate Natural Gas Company cases, emphasize the great distance that the United States went down the road of centralized, bureautic government in the past 15 years. In those years, the executive branch of the government grew amazingly powerful, took over functions that never should have been surrendered by the legislative branch, and by repeated appointments eventually established a final authority in the judicial branch sympathetic with its own philosophy—a situation not originally enjoyed.

In the tidelands case, the 6 to 2 decision was so sweeping in support of federal as opposed to states' rights that even the government's attorneys were surprised, having gotten more than they asked for. In the interpretation of the Natural Gas Act, the unanimous decision conceded to the Federal Power Commission even greater power than it claimed for itself, granting jurisdiction and control over every oil and gas producer whose gas eventually crosses a state line.

Both decisions immediately precipitated clamor for Congressional action, spelling out denial of centralization intent in the laws involved. Bills were introduced for leaving the tidelands to the states and for sharply defining and limiting the powers of the federal commission in natural gas regulation.

There was a time when the executive department cracked the whip over the legislative department, only to be stymied by the judicial department. Now the legislative department has reasserted itself and cracks the whip over the executive department, but finds it necessary to be very specific in the laws that are set down, lest they be broadened beyond Congressional intent by judicial interpretation.

Even now, the actual cost of development and replacement outweighs the price of crude. But this balance is now operating to right itself . . . . We are operating under a high level economy and as long as wages and materials and other operating costs are high the price of crude oil and its manufactured products must sell at a price which will permit the petroleum industry to remain progressive and continue to do an effective job of serving the public.

—B. A. HARDEY, *President,*
Independent Petroleum
Association of America.

Oil Industry Offers Many Opportunities

IF ANYONE ever doubted the opportunities in the oil industry these doubts should be removed by the July issue of "Service," publication of the Cities Service Company. On page 16 and 17, it tells how some of the key executives of that company started to work with the company, and what they received as their first pay. W. Alton Jones, president of Cities Service Company, started to work as a cashier at $45 a month. Benjamin C. Adams, president and general manager of Gas Service Company, started to work as a meter tester at $50 a month. Arthur W. Ambrose, president of Cities Service Oil Company (Delaware) started to work as a rodman at $45 a month.

In fact 12 presidents of Cities Service affiliates started to work with the company at salaries ranging from $19.50 per month to $150 per month. Their original occupations ranged from roustabout to testing engineer.

Pictured also on the page were eight other executives not yet presidents, who had similar beginnings. Herbert R. Straight, chairman of the board, started to work at Tidioute, Pa., at $37.50. Henry C. Walker, president of Arkansas Natural Gas Corporation, was really a highly paid employe back in 1910 when he started to work as a teacher-coach at $150 per month.

Greater Need For Public Relations

WITH demand for petroleum products exceeding supplies that can be made available to consumers in some sections of the United States, the industry faces a very critical public relations problem. It is not enough for oil companies to do everything possible to increase the capacities of facilities that now limit the movement of products into these areas. It is equally important that the public be fully and effectively informed on the matter.

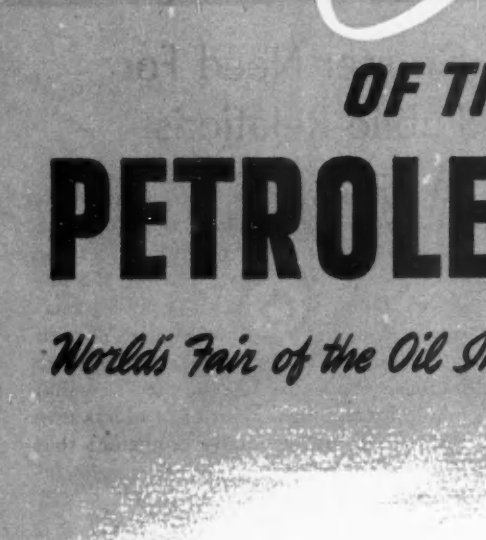
The public must understand there is not a shortage of oil itself, but on the contrary that the industry, although severely handicapped and delayed by lack of construction materials to catch up on war-delayed building, is furnishing the largest quantity of petroleum products in history in an effort to meet a startling increase in consumption. The public also must be told what the industry is doing to relieve the situation.

Individual companies, especially those marketing in areas where demand is likely to exceed available supplies, should take the initiative. Advertising, radio, newspaper and magazine articles and all other media should be used to reach the public. Unless positive action of this kind is taken promptly, the public in all probability will misunderstand the situation. The industry will be accused of all sorts of things, such as running out of oil, of not fulfilling its public duty. These accusations in the face of higher prices would give those desiring government regulation a chance they have been waiting for, with the result the industry will be confronted with the most serious threat of federal control it has ever known.

Here's the text: "In the 12 years from 1934 to 1946 the federal government has paid out $43,000,000,000 in subsidies," sayth Senator Harry F. Byrd. Now you preach the sermon.

Announcing THE Silver Anniversary OF THE INTERNATIONAL PETROLEUM EXPOSITION

World's Fair of the Oil Industry



INTERNATIONAL PETROLEUM EXPOSITION
TULSA, OKLAHOMA

The officers and directors of the International Petroleum Exposition are pleased to announce that the next "World's Fair of The Oil Industry" will be held in Tulsa, Oklahoma, May 15 to 22, 1948, celebrating the Silver Anniversary of the founding of the Exposition in 1923.

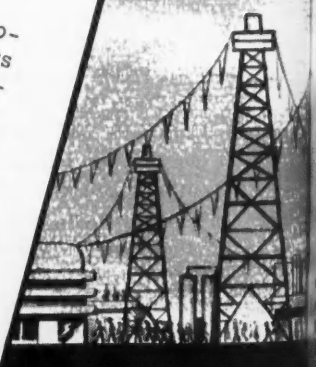
Since the last Exposition, held in 1940, the demands of war and the growing needs of industry, transportation, agriculture and the modern home have been a challenge to science, engineering and technology which has resulted in unprecedented advancement in methods, processes, equipment and supplies to meet the increasing demands on the petroleum industry.

Recent surveys have revealed an overwhelming approval for holding the first postwar International Petroleum Exposition in 1948.

The Exposition grounds are being expanded to provide additional space for exhibitors; and many leaders in the oil business, affiliated industries, trade associations, technical societies and government departments in the United States and many other nations are planning their attendance and participation.

You are cordially invited to be here.

INTERNATIONAL PETROLEUM EXPOSITION
W. E. Skelly, President



TULSA, OKLAHOMA, U.S.A., MAY 15-22, 1948

THE WEEK'S NEWS

HEARINGS before a Senate committee develop that both government and industry are confident all future oil needs of the nation will be met; military disclose that Middle East oil is not counted as a reserve in the event of another war. Story below.

Rizley Bill Delayed by Senate—Final congressional action on the House-approved Rizley Natural Gas Act amendments has been deferred until next year by the Senate committee in charge of the bill. Page 30.

Congress Eyes July 26 Adjournment—A number of measures of interest to the oil industry are being readied for President Truman's approval as Congress prepares for adjournment on July 26. Page 29.

Interstate Oil Compact is Extended—President Truman, without comment, has signed legislation extending the Interstate Oil Compact for another four years; with comment that they will probably be needed beyond that date, also has approved extension of export controls on oil, tubular goods and other commodities until February 29, next.

Reserve Productive Capacity Decreases—The oil industry's cushion of reserve productive capacity is down to approximately one-sixth the excess of capacity over production which made the oiling of World War II possible, according to a National Petroleum Council report. Page 30.

Tank Trucks Offered to Ease Oil Movement—For-hire tank truck operators have offered the services of 9,000 trucks to help meet the transportation difficulty. Page 30.

API Asks Repeal of Federal Auto Taxes—Repeal of all Federal automotive taxes, including the levy on gasoline, is recommended by the API as a step toward economic stability. Page 29.

Restrictions on Export of Pipe Tightened—OIT has tightened up on its restrictions, and only pipe and tubing "for essential pertoleum uses abroad" now are being permitted to be shipped. Page 28.

Superior Still Testing Deep Well—Superior Oil Company's Weller 51-11, five miles north of Fort Cobb, Caddo County, Oklahoma, world's deep test for oil, is still testing various formations with total depth being 17,823 feet. Page 28.

Senate Public Lands Body Told U. S. Petroleum Supply Problem Temporary

A Senate Public Lands subcommittee last week opened new hearings on the petroleum supply situation, apparently convinced in advance the United States is in no danger of becoming a have-not nation so far as oil is concerned and there is nothing wrong that the oil industry, given steel, incentive and freedom, cannot correct.

This view was voiced repeatedly during the hearings by Chairman George W. Malone of Nevada, who for much of the time was the only committeeman present. Without exception, government officials and industry representatives testifying at the hearing agreed the present situation is due to dislocation of transportation and lack of steel, that more oil will be found and produced, and the industry, possibly within a year or two—barring unforeseen adverse developments—will be over the hump.

Wider Gas Use Seen

To large extent, testimony duplicated that given before the House Interstate and Foreign Commerce Committee during its recent investigation (WORLD OIL, July 7-14), but to a considerable degree Malone led the witnesses, bearing down on the possibilities of easing the burden on oil by the greater use of natural gas, both as a fuel in that form and as gasoline. Indicating the committee had given this matter considerable thought, Malone said it had been estimated that by expanding the use of natural gas it could "replace" 25 to 45 percent of the petroleum now being used.

Malone also expressed interest in the comparative costs of U. S. and foreign oil, and to assist the committee in getting facts on world production, Colonel Ernest O. Thompson, chairman of the Texas Railroad Commission, presented the committee with his copy of the WORLD OIL *Atlas*, which he said would prove of great value for reference purposes and would answer many of the questions which would naturally arise in any discussion of world oil.

Thompson said Texas could meet any increased demand necessary to fill Middle West requirements next winter and, in fact, is seeking markets for oil and gas. He pointed out that today's situation is an outgrowth of wartime restrictions and failure of the government after the war to provide materials for the necessary modernization and expansion of the industry. However, he said, conditions could be quickly improved by making steel available for wells, refineries and pipe lines; increasing the crude price to open the way for more wildcat drilling; using lower octane gas, which he said is as good as is needed for present automobile engines and would save up to 75,000,000 barrels a year; and encouraging secondary recovery in old fields which were worked out before scientific methods of production were developed.

Going into the question of comparative crude prices with B. Brewster Jennings, president of Socony-Vacuum Oil Company, Malone learned it is not possible, for a number of reasons, to express them in cents per barrel. However, Jennings said, U. S. oil is more expensive to produce and Middle East oil is cheapest, with Venezuelan oil in between, but as against that Middle East oil has the highest cost of transportation to reach a market, Venezuelan oil on the average requires more expensive transportation than domestic oil, and the domestic oil is right in the world's greatest market.

"If to that consideration we add the problem of recovery of the capital already invested and to be invested in foreign oil operations, and think only of the future and not of the past," Jennings said, "I doubt over any extended period of time there will prove to be any great difference in the cost of producing oil and bringing it to U. S. markets from any of the principal producing countries."

James Terry Duce, vice president, Arabian American Oil Company, and Charles B. Rayner, petroleum adviser to the State Department, corroborated Jennings.

Foreign Costs Vary

Duce explained the cost of foreign production varied from time to time, from field to field and from well to well and, he said, "a good deal of misinformation regarding the cost of producing oil abroad has been spread about by people who never tried to produce it in foreign countries."

The cost of drilling in Saudi Arabia is double that in the United States; in addition the company has to provide housing, schools, hospitals, medical service, transportation, food, etc., for its employees, join with the government in constructing roads, ports, railroads, etc., and pay a royalty in gold. Other factors which must be considered are the political and economic risks involved, the latter including embargoes on products originating in Saudi Arabia which make it impossible for the company to sell in certain markets. The only offsetting advantage is the ability to operate fields with a minimum of wells and at the most efficient technical level.

While the Middle East reserves are anybody's guess, but admittedly tremendous, Duce told the subcommittee, Russia may have equal or greater prospects, although there is little information available at the present time.

"The area in which we believe oil will occur in Russia is immense," he said. "The richest deposits of oil ever found are probably those on the Apsheron Peninsula, whose center is the town of Baku. Formations which can yield oil extend widely over the central plains into the Arctic circle. There are great areas in Siberia which deserve prospecting and the great Turkoman-Caspian basin which extends from the shores of the Pruth to the storied cities

of Tashkent and Samarkand will undoubtedly continue to be one of the world's greatest sources of petroleum. All that is needed to supply Russia from its home resources for generations to come is the sedulous application of those methods of which the American has proved to be the past-master."

Rayner also took the position that, while there are no definite figures available, costs of Middle East oil laid down in this country probably are comparable to those of domestic petroleum.

Citing estimates made by L. F. McCollum of Standard Oil Company (New Jersey) in a recent paper before the IPAA board meeting at Jackson, Miss., Rayner commented "although these figures leave a great deal to be desired in the way of comparative costs of production, they would seem to indicate, however, that Caribbean oil need anticipate no immediate difficulty in competing with Middle East oil for North American markets."

Rayner reached this conclusion after tracing the effects of the war on the world movement of oil, during which he said there are three factors which will have a definite effect upon the flow of oil internationally: first, the gradual return of the Netherlands East Indies into the export markets; second, its effect upon the flow of Middle East oil exports, and, third, the marketing of the prospective increase in Middle East production laid down by pipe line on the eastern shore of the Mediterranean.

Movement of World Oil

"Conditions already are developing in the international petroleum trade that will result in oil produced in the Western Hemisphere finding its largest and most natural markets in that hemisphere," he said. "Such a consummation with its power of expansion in production should be encouraged not only from its economic feasibility but also from the standpoint of national and hemispheric security. Together with the tremendous potentiality of our own domestic petroleum industry, it should gradually provide a margin of safety between actual production and the maximum efficient rate according to recognized conservation principles."

Rayner's comments on the future of Western Hemisphere oil illuminated testimony given by Admiral John H. Hoover, chairman, and Colonel G. H. Vogel of the Army-Navy Petroleum Board that Middle East oil would not be a reserve to the U. S. in the event of war, particularly a war with Russia.

Vogel admitted the military did not include the Middle East in its war planning after Hoover read a statement setting forth the now-familiar Army-Navy program to insure the oil safety of the country.

Military requirements for the current fiscal year, Hoover said, will amount to about 107 million barrels, and under questioning Vogel said that figure will apply so long as we have occupation troops abroad, after which it will drop.

During the questioning of the two officers, Malone made acid comment about the frequently recurring assertions that the United States is running out of oil, iron, tungsten or something else, commenting that too many people are talking who know nothing, apparently, about the manner in which the oil industry, for one, has repeatedly confounded the dire predictions of "experts."

Malone had reference particularly to an informative paper which had been submitted by Russell B. Brown, general counsel of the IPAA, citing prophets of doom from as far back as 1885 and in each instance showing what actually happened.

Department of Commerce officials testified that exports of steel, oil, and other controlled commodities are based on quotas "which it appears the country can afford to export."

However, they said, quotas on oil and tubular goods have not yet been set because of new responsibilities imposed on the Office of International Trade by legislation which would go into effect the following day, and methods of determining them had not yet been settled.

Wilburn C. Schoeder, chief of the Bureau of Mines office of synthetic liquid fuels, estimated that on the basis of present knowledge a production of some 2 million barrels of oil from coal and shale could be developed in two to four years in the event of a national emergency.

Summing up the results of the three-day hearing, Malone said the testimony showed "there is neither a short term nor a long term shortage of oil in this country."

Next winter's spot shortages in the Midwest, the Senator said, will be the result of the lack of steel to build new pipe lines and tank cars, with the small number of new wells drilled during the last five years as a subsidiary factor.

"Testimony also showed that one of the salient reasons for the lack of steel available in the United States has been the increased export of steel tubular goods to foreign countries," he added.

Exports, which in 1938 amounted to 6.8 percent of the total domestic production of steel tubular goods, amounted to 12.1 percent of production in the first quarter of this year.

Superior Still Testing World's Deepest Well

Company officials of Superior Oil Company of California at Oklahoma City reports that crews are testing "every formation from bottom to top" at the world's deepest test, the Weller 51-11, NW NW NE 11-8n-12w, five miles north of Fort Cobb, Caddo County, Oklahoma.

Edwin L. Smith, in charge of Oklahoma City offices, said the testing program was being carried out "so we will know what we have." He said that due to the great depth of the hole (bottomed at 17,823 feet) the company felt it should test all zones before any possible difficulties could arise, and before drilling any deeper.

No information is being released on geological horizons.

OIT Tightens Restrictions On Exports of Pipe, Tubing

Congressional discussions of the steel export situation have led the Office of International Trade to tighten up its restrictions, and only pipe and tubing "for essential petroleum uses abroad" now are being permitted to be shipped, it has been disclosed by Acting Secretary of Commerce William C. Foster.

Foster acknowledged the recent action in putting seamless pipe and tubing under individual license and cutting back sharply on exports resulted from the increased stringency of petroleum supplies in the United States.

Third quarter quotas for export of steel products are being subjected to the "severest scrutiny" and will be determined only after weighing the urgency of foreign need against the severity of our domestic requirements, he said.

"There will be severe shortages of steel throughout the world for many months to come and we seek to approve only such exports as will alleviate the severest hardship abroad," Foster explained. "We cannot hope to spare enough steel to meet all urgent foreign needs."

Lake St. John Field Cycling Operations Inaugurated

Cycling operations in Louisiana's first completely unitized gas condensate oil field was inaugurated July 19 at Lake St. John in Tensas and Concordia parishes.

Joseph L. McHugh, Louisiana Conservation Commissioner, headed a group of state and parish officials who inspected the field and the newly completed plant which has facilities for processing 100 million cubic feet of gas per day.

The entire project has been unitized and designed so that all field products are handled through the pressure maintenance and natural gasoline plant which comprises the cycling process. The products include crude oil, condensate, butane and propane.

Unitization plans previously have been applied to oil production and to gas cycling, but Lake St. John provides the first effort at unitizing both activities in a single project. Under the unitization procedure each operator and royalty owner receives a share of the production from the entire field in proportion to the value of recoverable reserves under his tract.

Hulcy Heads Committee

D. A. Hulcy, president, Lone Star Gas Company, Dallas, has been named chairman of the Natural Resources Committee of the U. S. Chamber of Commerce for the current chamber year, it was announced July 21 by Ralph Bradford, executive vice president. Also on the committee are L. F. McCollum, Standard Oil Company (New Jersey); Albert C. Mattei, president, Honolulu Oil Corporation, and James Tanham, vice president, The Texas Company.

Oil Industry Measures Readied for President as End of Congress Near

Driving ahead with a view to adjourning July 26, Congress last week paved the way for retention of the social security taxes at their present rate of one percent, each, on employer and employee until 1948, forestalling an automatic increase to two and one-half percent next January.

Several other measures of interest to the industry also were readied for President Truman's approval, including one setting up a National Science Foundation to correlate government and private research, and another establishing a program for the elimination of stream pollution.

As Congress prepared to close shop for the summer it laid aside a number of subjects, to be revived next year. Probably the most important of the measures scheduled for 1948 enactment is a new tax bill representing the first effort in many years to overhaul the entire tax structure.

Also to be worked on next year is a national rubber policy which will provide for peacetime maintenance of the synthetic rubber industry, and revision of the recently-enacted Hartley-Taft labor act. Anti-monopoly and small-business legislation also are due to come up next session.

Meanwhile, President Truman last week signed legislation continuing export control until February 29, next, but warned that maintenance of the restrictions beyond that date probably would be necessary.

Major commodities which may require control for at least another year are petroleum products and petroleum tubular goods, both of which were again placed under restriction this month.

"I wish it had not been necessary to request a continuation of these controls," the President commented in signing the act. "But world shortages have by no means been dispelled and the threat of inflation has not been dissipated.

"Our objective continues to be the removal of interferences with world trade. I should be less than candid, however, were I not to say that I believe the need for some supervision of our foreign trade will continue beyond next February."

Legislation giving natural gas pipe line companies rights of condemnation when unable to reach agreements with land owners on right-of-ways was passed by the Senate February 17 and sent to the President for approval.

Agreement Reported Near For Control of Tidelands

Department of Justice and California officials are reported close to an agreement regarding the interim administration of the offshore oil fields recently held by the Supreme Court to belong to the federal government rather than the state.

Meetings were held last week at which, reportedly, an agreement was developed that, pending perfection of a permanent program for control of the tidelands, existing state leases for oil development will remain valid and the state will continue to collect the royalties called for placing the funds in escrow.

Legislation calling for the transfer of the tidelands back to the state still is in the hands of congressional committees and will not be acted on this year. Conferences also have been held between Justice and Interior officials regarding the status of present holders of state leases and the general tenor of the policy to be adopted with respect to the newly acquired federal lands.

Lower Ratios Are Sought

The Sun Oil Company last week asked the Texas Railroad Commission to reduce the gas-oil ratio allowance for the Sun and Garcia Fields in Starr County. The allowance now is 2000/1, and the company asked that this be reduced to 1500/1 in order that gas might be conserved and reservoir voidage in the fields reduced.

Crude Oil Production in the United States

(Estimates compiled by WORLD OIL. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED July 19	July 12
Alabama	1,150	1,100
Arkansas	75,500	75,750
California	921,800	917,600
Colorado	46,000	45,000
Florida	1,000	975
Illinois	181,500	178,000
Indiana	18,000	18,000
Kansas	294,750	285,800
Kentucky	27,000	26,750
Louisiana	421,300	421,550
North Louisiana	96,750	97,000
South Louisiana	324,550	324,550
Michigan	53,000	42,000
Mississippi	97,150	98,600
Missouri	100	100
Montana	23,000	24,750
Nebraska	550	550
New Mexico	108,650	108,650
New York	13,200	12,900
Ohio	8,275	9,000
Oklahoma	388,100	387,900
Pennsylvania	34,800	34,100
Tennessee	25	25
Texas	2,224,050	2,224,050
Tex. R. R. Comm. Districts:		
Dist. 1—South Central	22,400	22,400
Dist. 2—Middle Gulf Coast	163,350	163,350
Dist. 3—Upper Gulf Coast	479,650	479,650
Dist. 4—Lower Gulf-S.W.	241,650	241,650
Dist. 5—East Central	39,150	39,150
Dist. 6—East Texas Field	324,000	324,000
Dist. 6—Rest of Northeast	113,400	113,400
Dist. 7-B—North Central	37,100	37,100
Dist. 7-C—West Central	38,850	38,850
Dist. 8—West	555,250	555,250
Dist. 9—North	125,500	125,500
Dist. 10—Panhandle	83,750	83,750
Virginia	200	200
West Virginia	7,000	7,000
Wyoming	117,800	118,000
Total United States	5,063,900	5,038,350

Total stocks, foreign and domestic, July 12, as reported by the Bureau of Mines were 232,361,000 barrels.

Repeal of Federal Auto Excise Taxes Urged by API

Repeal of all federal automotive excise taxes, including that on gasoline, was urged upon the House Ways and Means Committee last week by the American Petroleum Institute.

In a statement filed with the committee by API President William R. Boyd it was declared such action would be a practical step toward continued high employment and sustained prosperity.

Figures compiled by the Public Roads Administration showed that motor vehicle highway consumption of gasoline last year was 25,649,000,000 gallons, or more than 1,450,000,000 gallons more than the previous high of 24,192,000,000 gallons in 1941. Boyd estimated that the average car owner paid $42 in gasoline taxes last year, and $23 in other special fees, while the Automobile Manufacturers Association figures that the purchaser of a new car, under present laws, must pay about $130 in taxes during the first year of operation.

"Although gasoline probably contributes more importantly than any other single product to the Nation's economy and welfare, it is now being taxed as heavily as many other products which are generally regarded as luxuries," Boyd said. "But to group gasoline in the luxury classification for taxation purposes is, in the opinion of most tax experts, wholly erroneous and unjustified."

The government 1½-cent tax, imposed on top of state gasoline taxes running as high as seven cents a gallon, is "confiscatory, uneconomic and unfair," he declared.

Governors Ask Congress to Clarify Tidelands Issue

A resolution by Governor Beauford Jester of Texas against federal assumption of state title rights to tidewater lands was adopted unanimously last week at the thirty-ninth Governors' conference in Salt Lake City.

Governors of some 42 states joined with Governor Jester in calling upon Congress for clarifying legislation in the tidelands issue.

Unanimous approval of the resolution was regarded by Governor Jester as a bulwark of support in the fight by Texas and other tidewater states to retain unclouded title to these lands.

Texas Gas Hearing Planned

A hearing has been scheduled by the Texas Railroad Commission for September 4, at Amarillo, to determine whether gas produced in the Panhandle should be prorated without regard to sulphur content. Currently the Commission has in effect an order prorating sour gas, but apparently it plans to prorate sweet gas as well. While there is no physical division between the sweet and sour gas area, the dividing line has been established by determining where the gas lies which contains a sulphur content too high to be used for fuel purposes.

NPC Reports Oil Industry's Reserve Productive Capacity Down Since War

A National Petroleum Council committee reported last week that the domestic industry has a reserve capacity to produce of only 165,035 barrels of crude daily, in contrast to the cushion of more than a million barrels daily at the outbreak of the war.

The industry currently in producing more oil than ever before, approximately 5,106,385 barrels daily, the committee on petroleum production and crude availability said, but as a result of wartime restrictions it is estimated that 67,000 wells could not be drilled during the past five years to keep pace with rising demand, and to develop even what has been developed "the producing branch of the industry has had to search for pipe with as much vigor as it normally uses in looking for new oil pools."

The report, as adopted at the recent council meeting, was made public by NPC Chairman Walter S. Hallanan, who pointed out that had casing and pipe been obtainable substantial quantities of oil would have been available.

Excess Production Cited

The figures in the report, showing that the only excess productive ability is 128,750 barrels in West Texas and 36,285 barrels in Wyoming and Colorado, most of it in the Rangely and Elk Basin fields, portray the situation as it exists today, it was emphasized by the committee, "and in no sense represent future productive capacity or availability which is dependent upon the extent and results of exploration and development work now in progress or not yet drilled.

"Due to steel shortage many proven locations must be postponed until the supply is available," the committee said.

"It is the considered opinion of this committee that the productive capacity of both crude petroleum and other liquid hydrocarbons can be increased by a substantial volume if the necessary supplies of steel products, particularly tubular goods, can be made available to the industry so that additional wells can be drilled in producing areas and other necessary facilities can be constructed. The oil producers, both large and small, are doing a magnificent job in the face of these difficulties, but production availability inevitably suffered as a result of these shortages."

Situation by Areas

Discussing the situation by areas, the report showed that availability in District 1, where no transportation or other difficulties are being encountered, is considered as equal to the current rate of production of approximately 56,100 barrels daily; District 2 production approximates the maximum efficient rate although the completion of unitization of two fields may make some increase possible within the next few months, and for purposes of present availability the current output of 960,200 barrels daily is considered representative; District 3, as noted, has excess capacity over its present output of 2,980,000 barrels due to lack of transportation; District 4 also has excess over its production of 190,085 barrels daily, and in District 5 there is no excess capacity over the current output of 920,000 barrels daily.

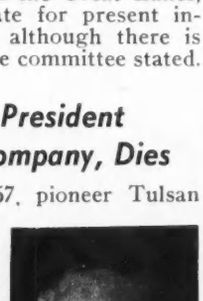
Production of other petroleum liquids also is handicapped by lack of materials, the committee reported; present production is placed at 10,300 barrels daily in District 1, 48,780 in District 2, 264,700 in District 3, 3200 in District 4 and 67,200 in District 5, a total of 394,180 barrels daily.

Hallanan also released the adopted report of the committee on barge transportation, which showed that in spite of an increase of more than ten percent over July 1, 1946, in oil barge capacity and a comparable increase in towing power, there is a substantial shortage of barge capacity on the Mississippi River system due to the demand for long-haul barge movements from the Gulf area.

Barge equipment operating in the East Coast are and on the New York barge canal, and tankers on the Great Lakes, appear to be adequate for present industry requirements, although there is little or no surplus, the committee stated.

Henry N. Greis, President Of Deep Rock Company, Dies

Henry N. Greis, 67, pioneer Tulsan and president of the Deep Rock Oil Corporation and the Burke-Greis Corporation, died in Tulsa July 16.



Henry N. Greis

A native of Buffalo, New York, Greis moved to Tulsa in 1909. He was a graduate of the U. S. Military Academy at West Point, N. Y. When Deep Rock was reorganized in 1940, Greis was made chief executive of the firm. When the firm went into receivership Federal Judge Franklin E. Kennamer appointed Greis sole trustee of the corporation for all the properties throughout its operating area.

Humble Operating New Line

Humble Pipe Line Company is now operating 28.99 miles of sweet crude line from a point near Albany, Shackelford County, West Texas area, to Putnam, Callahan County. The line was rerouted and shortened mainly to recover pipe and as an alternative to connections with the company's Panhandle 10-inch line. New pipe laid consists of 5.11 miles of 5¼-inch and 12 miles of 6-inch.

Vote by Senate Committee Halts Rizley Bill Action

By a vote of six to five, July 17, the Senate Interstate and Foreign Commerce Committee put the House-approved Rizley bill to amend the Natural Gas Act on ice until next year.

Final enactment of the measure this session had been foreseen as depending upon the weakness of the opposition in the Senate and while Senator E. H. Moore of Oklahoma, co-sponsor of the bill, secured an agreement for later reconsideration of the vote, the size of the opposition within the committee itself practically bolted the door against action this year.

The measure did not secure a place on the legislative list recently prepared by Senator Taft of Ohio, but Taft did not definitely rule it out since he said some matters not on the list might also be considered before adjournment. It was made clear, however, Republican leadership would not attempt to bring up bills over which controversy is so sharp that the Senate might consume a great deal of time in their debate.

The Rizley bill was passed by the House without a record vote and without change from the form in which it was reported by the Interstate and Foreign Commerce Committee after many weeks of consideration.

Only two efforts were made from the floor to amend the measure, one by Representative J. Percy Priest of Tennessee to substitute legislation urged by FPC confining action to the exemption of independent producers and gatherers, which was rejected without a counted vote, and the other a motion to recommit the bill and substitute the Priest amendment, which was rejected by a vote of 64 to 254. Immediately after that vote, the bill was passed without a record vote.

Tank Trucks Are Offered To Ease Movement of Oil

More than 9000 tank trucks with a total capacity of approximately a million barrels were placed at the disposal of the oil industry last week as a means of easing the current transportation situation.

The offer was made by National Tank Truck Carriers, Inc., the trade association of the for-hire tank truck operators, in a letter to OGD Director Max W. Ball, in which it was pointed out that during the war the use of trucks for hauls under 200 miles released more than 20,000 tank cars for long hauls.

Association officials said that a nationwide survey showed that petroleum road transports are operating, generally, at little more than 50 percent of capacity because loading and unloading facilities were not operating on a basis to permit 24-hour-a-day transportation. Many of the pipe lines, refineries and marine loading terminals were found to be operating only between 7 a. m. and 5 p. m., it was said, with few terminals remaining open later, and closing down for weekends in some instances from midnight Friday to midnight Sunday.

Large Scale Exploration Work Needed As German Oil Output Continues Drop

The German oil fields continue to show a marked decline in production due to economic difficulties, shortage of materials, and the exhaustion of the older fields. The output of crude from January to April of this year has been only a little over 1,204,000 barrels. If this rate of production continues for the remainder of the year, the yield will amount to 3,619,000 barrels which will compare very unfavorably with the figure of 4,494,000 barrels produced last year.

It seems that exploration on a large scale will be necessary if further decline is to be prevented. Attention will probably be concentrated on the area near the Dutch border where the fields of Lingen, Emlichheim and Georgsdorf are geologically favorable for extension. The Wintershall A. G. is reported to be planning an important drilling program at Emlichheim. The gas output from the Bentleim wells which amounted to about 2½ billion cubic feet in 1946 will probably be increased considerably, and a pipeline may be constructed from this area to Hamburg where several refineries have been restarted.

The synthetic oil plant at Wesseling in northwestern Germany will start operations in August. It will produce 3000 tons a month of synthetic ammonia for conversion into fertilizers.

In the districts of Tubingen, Rechingen and Rottweil in southern Wurtemberg in the American zone, the existing plants for the production of oil from shale have been started, and diesel engine fuel is being produced.

Five wells are now being drilled in the Zwischenahner district of the British zone in Germany. This area is located about 34 miles from Bremen and has previously been the site of extensive geological investigations.

Zistersdorf Output Nears 500,000 Barrels Monthly

Present production from the Zistersdorf fields is now averaging between 435,500 and 500,000 barrels a month. Of this, only 5 percent is being used by the Red Army on the spot while 55 percent is being exported to Czechoslovakia and other neighboring countries.

The supply position in the western zone of Australia remains unsatisfactory, but there are indications of progress out of the deadlock previously existing on the Austrian oil question, since during recent weeks agreement has been reached between the four occupying powers that the Austrian Treaty Commission should start discussing the ownership of the oil concessions.

British Licenses Dropped

The Anglo-American Oil Company has abandoned two of its three remaining prospecting licenses in the United Kingdom. These are areas of 168 and 45 square miles respectively in the County of Lancashire and on the adjacent sea bed. The production of natural gas has fallen to 200,000 cubic feet daily, mainly from the Anglo-Iranian wells, and this production is still declining although exploration is going on.

Extended Operations Due West of Coevorden Field

The Bataafsche Petroleum Mij., the operating company of the Royal Dutch Shell Group, plans to extend its drilling operations west of Coevorden in the province of Drenthe, the Netherlands. Production from the present Coevorden fields is now approximately 3500 barrels daily from 45 wells, which meets about 10 percent of Holland's oil requirements. The Bataafsche Mij. is also planning wildcats for other parts of Holland, notably the Dutch Wadden Islands.

In 1946 50,000 feet were drilled in the Coevorden field, 17 producing wells were completed, and 436,000 barrels of oil produced.

Russia Reports Crude Oil Output Goal Surpassed

The oil industry of the southern and western districts of the USSSR has completed its 6-months output plan ahead of time. The daily output of oil in June was 16 percent higher than in January, and drilling increased by 40 percent over the same period last year.

Test wells are to be drilled in the near future in the Komrat Orgeyev and Bolgrad areas of Moldavia. This territory was finally ceded to Russia by Roumania in 1944, and lies on the east of the Dniester River.

According to a Moscow report, large deposits of ozokerite, claimed to be the most extensive in the world, have been discovered in the Central Asiatic region of the USSR.

Russia has offered to supply for consumption in the United Kingdom some 7 million barrels of petroleum products during the remainder of 1947. A recently concluded agreement between the Soviet Union and Italy covers the initial supply to Italy of some 250,000 barrels of kerosine and gasoil.

Klimov and Chudnovsky of the Peat Institute of the Bielorussian Academy of Sciences have developed a scheme for the complex utilization of peat burnt in power stations. The new process consists of treating the peat chemically by gasification before sending it to the power station. The power station receives excellent gaseous fuel and the remainder of the peat after treatment is used to make synthetic gasoline. The process of complex utilization of peat is reported to reduce the cost of synthetic gasoline as well as the quantities of peat consumed in power stations.

Haifa Refinery Expansion Planned by Consolidated

The Haifa plant of Consolidated Refineries, Ltd., owned jointly by the Anglo-Iranian and Shell Companies, is to be extended to produce lubricating oil.

The extension of the refinery will involve three stages: First, rehabilitation to put on a permanent basis the present 30 million barrels a year throughput capacity, which was obtained by improvisation during the war; second, installation of the oil plant; and thirdly, increase of overall capacity to about 65 million barrels a year. The total lubricating oil producing capacity will be about 1,750,000 barrels annually. All grades and qualities of lubricating oils, both basic and blended, will be produced.

A program of lubricating oil plant installation is also being put in hand by the Anglo-Iranian at Abadan, and this refinery will eventually produce 175,000 barrels a year of lubricants.

Italy's Monthly Oil Flow Averages 5850 Barrels

The monthly production of petroleum in Italy is at present about 5850 barrels, while natural gas output is about 165 million cubic feet. The production of asphaltic limestone averages about 19,500 metric tons a month.

In connection with the drilling in progress in the delta of the River Po by the Italian-American S.I.A.M. Company, plans have been completed to supply Milan, and later Verona, Brescia, Bergamo, Mantua and Cremona (all in the upper Italian Plain) with natural gas. Five billion lire, or some $10 million, will be required to execute the plans, which provide that Italian materials are to be used chiefly, although U. S. equipment valued at $2½ million will be imported. It is planned to supply Milan in the first half of next year with more than 35 million cubic feet of natural gas daily.

An agreement has recently been reached between the AGIP and the Sinclair Petroleum Company of New York, under which the results of the geological investigations made in Italian East Africa by the AGIP have been put at the disposal of Sinclair. This seems to point to an eventual collaboration between the two companies for oil exploration in Africa.

Yugoslavia Parley Is Set

A conference is to be held shortly in Belgrade between British and Yugoslav delegates which it is hoped will settle the compensation to be paid for the expropriated British oil properties in that country. These assets are estimated at about $50 million, and include a refinery and storage plants belonging to the Shell and Phoenix companies. •

Iran Production Drops

Crude oil production in Iran during the first three months of 1947 amounted to 33,653,568 barrels, or 373,929 barrels daily. The daily output compares with an average daily production of 397,776 barrels during 1946. Total output for 1946 was 145,188,143 barrels.

TGT Will Construct New Experimental Compressor Station to Increase Flow

The Tennessee Gas and Transmission Company of Houston has received permission from the Federal Power Commission to construct a new experimental compressor station this year on its natural gas pipe line at a point near Morehead, Kentucky.

The new station will utilize centrifugal compressors driven by induction electrical motors instead of the conventional gas engines. The company will install a unit of three 3600 RPM centrifugal compressors in series, with each compressor driven by a squirrel-cage induction electric motor. The capacity of the station will be approximately 350,000 MCF daily, with a suction pressure of 600 pounds per square inch and a discharge pressure of 750 PSI. Approximately 5500 horsepower of compression will be required under design conditions.

TGT estimated the total cost of installing the experimental station at $477,000, which will include all the equipment, site, buildings and cottages for operating personnel. The application set out that in case the new compressors prove unsatisfactory, substantial salvage could be expected from the materials.

The cost of operation of the facilities, exclusive of depreciation, was estimated at $280,000 annually, the bulk of which, $246,000, would be for electric power.

The company said construction of the station would enable it to substantially increase its deliveries of natural gas to the Appalachian area this winter.

Authorization Is Sought For Michigan Gas Carrier

Michigan Consolidated Gas Company has asked the Federal Power Commission to determine whether it has jurisdiction over facilities which it proposes to construct for storage in the Austin field of natural gas obtained from Panhandle Eastern Pipe Line Company and, if it determines it does have jurisdiction, to issue the necessary authorization.

The company proposes to operate a 26-inch line between the field and Detroit, pending completion of the Michigan-Wisconsin Pipe Line Company project, and to construct a 26-inch line from Evergreen to Melvindale, where gas is received from Panhandle, at a cost of $1,014,000.

Wyoming Company to Build Denver-Cheyenne Gas Line

Wyoming Gas Company has been given approval by FPC for construction of 120 miles of 8-inch line from Denver to Cheyenne. The line will cost approximately $1½ million and will parallel an 8-inch line now operated by the company. The lines furnish gas to the towns of Longmont, Boulder, Fort Collins and Greeley, Colorado, as well as Cheyenne. Construction is to commence next year.

Gas for the line will be furnished by Colorado Interstate Gas Company's new 20-inch line from Hugoton, Kansas, to Denver. The latter line is now under construction, and will be completed this fall.

Kinsolving Is Named Head Of Sun Pipe Line Company

William C. Kinsolving has been elected president of the Sun Pipe Line Company (Texas), John G. Pew, retiring president of the company and also vice president in charge of production of Sun Oil Company, has announced.

W. C. Kinsolving

The election of F. Hill Sanders as vice president, general manager and a director, and of Sanford E. Ogle as vice president and a director, were also announced by Pew.

Kinsolving, a native of Corsicana, Texas, joined Sun Oil Company as an oil field worker after receiving a degree in electrical engineering from Cornell University in 1923. During World War II he was commissioned a colonel in the Army Corps of Engineers and played a prominent role in the building of the China-Burma-India pipe line.

New Facilities Authorized For Pennsylvania Gas Line

The Federal Power Commission has authorized the New York State Natural Gas Corporation to construct facilities at a cost of $5,342,366 to increase the capacity of its transmission and storage systems to care for increased takings of gas from the Big Inch lines and the Hope Natural Gas Company.

The new facilities will include 90 miles of loop lines in Pennsylvania and the installation of six compressors at its Boom station to enable the company to take 90,000 MCF of gas daily, to be completed by next December 1, and approximately 59 miles of loop line to be built in 1948.

West Texas Outlet Boosted

Gulf Refining Company, pipe line division, has increased the capacity of its West Texas trunk line outlet to 124,000 barrels daily through the completion of 82 miles of 10-inch loops between Midland and Lufkin stations. The final loop was tied-in July 18, and provides the company with a triple 10-inch system out of the Permian Basin. However, 10,000 barrels daily is discharged at Sweetwater, Texas, in supplying Gulf Refining Company's refinery.

Frio Pipe Line Company Formed by Highland Oil

The Frio Pipe Line Company has been formed in Houston as a subsidiary of the Highland Oil Company, owned by George and Herman Brown. The pipe line company will transport gas from properties being developed by Highland in Frio County to a junction point in Zavalla County, where the gas will be turned over to the Texas Gas Utilities Company.

Frio Pipe Line Company is now constructing a 6-inch line westward from the Pearsall pool some 50 miles to join with the Texas Gas Utilities Company. Cost of the project is $500,000. The contract between the two companies calls for delivery of approximately 2 billion cubic feet of gas per year.

V. A. Brill is president of the Frio Pipe Line Company, George and Herman Brown are vice presidents, Herbert Frensley is secretary, J. T. Duke, treasurer and A. M. Cannan, assistant secretary.

Railroads Ask ICC For Increased Freight Rates

The Interstate Commerce Commission has been asked by all the railroads of the country to permit a further increase of $1091 million a year in freight rates, to be additional to the increases of last January, amounting to approximately $1200 million annually.

As applied to petroleum and products in tank cars, the carriers' application calls for increases of 25 percent within eastern territory and between eastern territory and southern and western territories, and 15 percent in southern and western territories and between them, but not to exceed six cents per hundred pounds.

Although this is the second application for freight increases to be sought since the end of the war, the railroads warned that it may not be the last, declaring the additional revenue sought is designed only to meet current operation costs and "if present operating expenses should increase subsequent to the filing of this petition, whether due to increased costs of fuel, materials and supplies, or to increased wages, it will be necessary to bring the changed situation to the attention of the commission by a supplemental petition."

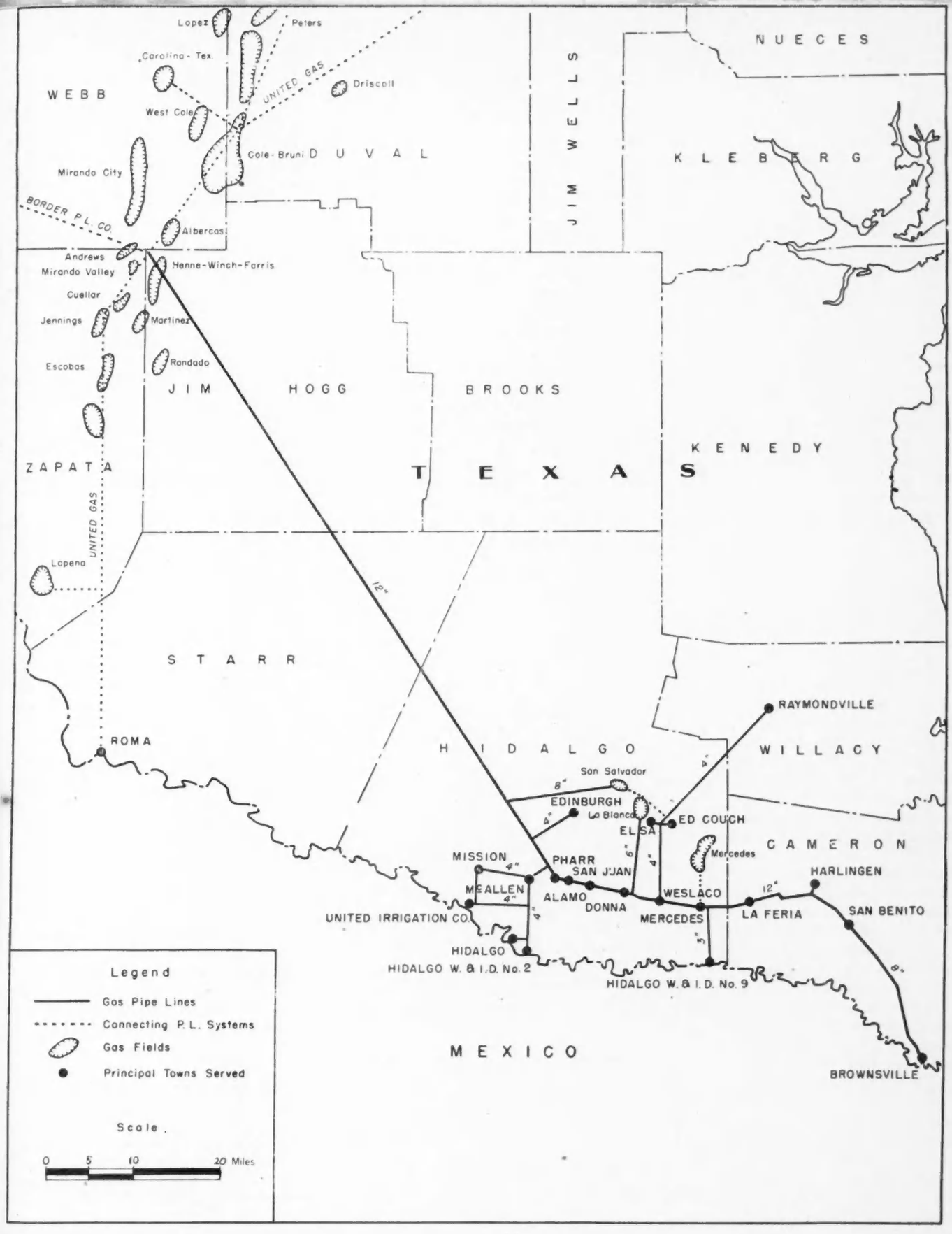
Midland Carrier Boosted

Atlantic Pipe Line Company has boosted the capacity of its Permian Basin 10-inch crude carrier between Midland and Atreco, Texas, from summertime peak of 43,000 barrels to 48,000 barrels daily through the installation of larger impellers on the centrifugal pumps at each of its 11 mainline stations. The system was handling 47,600 barrels daily late last week while operating at 990 pounds pressure. Plans are not to exceed 1000 pounds pressure as a safety factor. This line made initial delivery of West Texas oil to Atreco on January 8, 1929.

Pipe Lines of the U. S.

Rio Grande Valley Gas Company

24th of a Series



Olds' Decline Curves

By E. RUSSELL LLOYD,
Consulting Geologist, Midland, Texas

IN 1925 and 1926 it was my privilege to be associated with the late Thomas H. Olds, then of the consulting firm of Fisher, Lowrie & Olds of Denver,[1] in estimating the oil reserves of a large number of leases in the Mid-Continent and Rocky Mountain regions.

Olds was convinced that for the great majority of the wells with which we had to deal the rate of production plotted against time would be a straight line with a negative slope, on logarithmic paper that is, a hyperbolic type of curve. His problem was to avoid the tedious and, in many cases, inaccurate work of shifting the curve for each lease back and forth on logarithmic paper until it would fall approximately in a straight line, or the still more tedious work of calculating the equation of a curve for each lease by the Method of Least Squares.

The method originated by Olds is to use the general equation of a hyperbolic curve and by giving different values to the parameters to obtain a considerable number of type curves such that the decline curve for any lease, if hyperbolic, will approximate one of these type curves. Furthermore, by integrating the general hyperbolic equation, he got a general equation for future production, and by using the same values for the parameters as in the type decline curves he got corresponding future production curves such that once a type curve is selected for a particular well or lease the future production for any given rate of production can be read directly from the corresponding future production curve.

Figure 1 shows the decline and future production equations as developed by Olds and reproduced as originally drawn by him. For practical purposes x has been used to represent time expressed in years and y the production rate in barrels per well per day. Other units of time and production rate could readily be used. With the use of production rate on a daily basis and time on a yearly basis it is necessary to multiply the value of A in future production equations by 365 to obtain correct results.

For each type curve selected sufficient coordinate points are calculated to enable the curve to be plotted with reasonable accuracy on semi-logarithmic paper and these type curves are drawn on heavy white stock or may be mounted on cardboard. Factual data for a well or lease to be investigated are plotted as points on semi-transparent paper on the same scale which is then moved back and forth over the heavy paper on which the type curves are drawn until a curve is found which will approximate an average curve for the well or lease. In practice it has been found necessary to construct several sheets of type curves because it is confusing to have too many such curves on one sheet.

In Olds' equation C is the value of x when y equals 1, so C is an expression of time in years and the curves may be conveniently grouped as ten-year curves, 20-year curves, etc. Similarly, n is the reciprocal of the slope of the curve on logarithmic paper. In the curves in common use n ranges from 0.1 to 0.5 in value and the curves may be grouped according to the values of n. For convenience in reference, the type curves are labeled according to the values of C and n with the decimal point of n omitted. For example a 20-25 curve means that the value of C is 20 years and the value of n is 0.25.

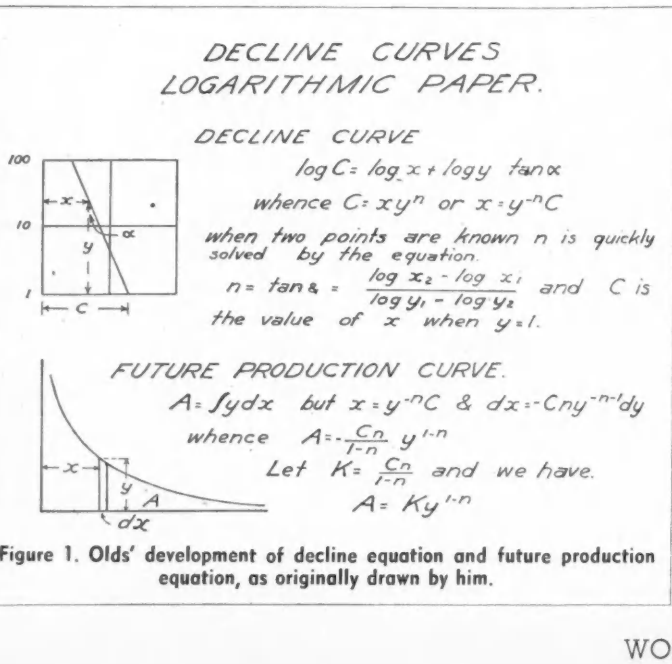

DECLINE CURVES
LOGARITHMIC PAPER.
DECLINE CURVE
$\log C = \log x + \log y \tan\alpha$
whence $C = xy^n$ or $x = y^{-n}C$
when two points are known n is quickly solved by the equation.
$n = \tan\alpha = \frac{\log x_2 - \log x_1}{\log y_1 - \log y_2}$ and C is the value of x when y = 1.
100
10
1
x
y
α
C
FUTURE PRODUCTION CURVE.
$A = \int y\,dx$ but $x = y^{-n}C$ & $dx = -Cny^{-n-1}dy$
whence $A = -\frac{Cn}{1-n}\,y^{1-n}$
Let $K = \frac{Cn}{1-n}$ and we have.
$A = Ky^{1-n}$
x
y
A
dx

Figure 1. Olds' development of decline equation and future production equation, as originally drawn by him.

Several type curves are shown on semi-logarithmic paper on Figure 2. It is to be noted that the higher the value of n the greater is the curvature on semi-logarithmic paper. High values of n represent wells with rapid decline in productive rate in their earlier years and much slower rate as the capacity decreases. In practice the writer has found it convenient to use paper on which the vertical scale is three logarithmic cycles and the horizontal scale is divided into ten years by months. This scale is, however, inconvenient for illustrative purposes because for values of C that are greater than ten years only a part of the curve can be shown on one sheet. Of course, the horizontal scale used in Figure 2 results in curves with greater slope than those used in practice.

A given hyperbolic curve can be plotted in only one position on logarithmic (log-log) paper if it is to assume a straight line form but when plotted on semi-logarithmic paper it can be shifted horizontally to suit the convenience of the appraiser.

Future production curves corresponding to the decline curves on Figure 2 are shown on Figure 3. These are drawn on regular logarithmic paper and like the decline curves are straight lines but with

About the Author

E. RUSSELL LLOYD received his academic training in geology at Oxford University, England (Rhodes scholar) and the University of Chicago. University training was followed by seven years with the U. S. Geological Survey. Since 1919 he has held positions with various oil companies and has engaged in consulting geological work in the Rocky Mountain states and in the Permian Basin of West Texas and New Mexico. He has lived in Midland, Texas, since 1928 and has been particularly interested in Permian stratigraphy and appraisals. He is an associate editor of the American Association of Petroleum Geologists and a Fellow of the Geological Society of America.

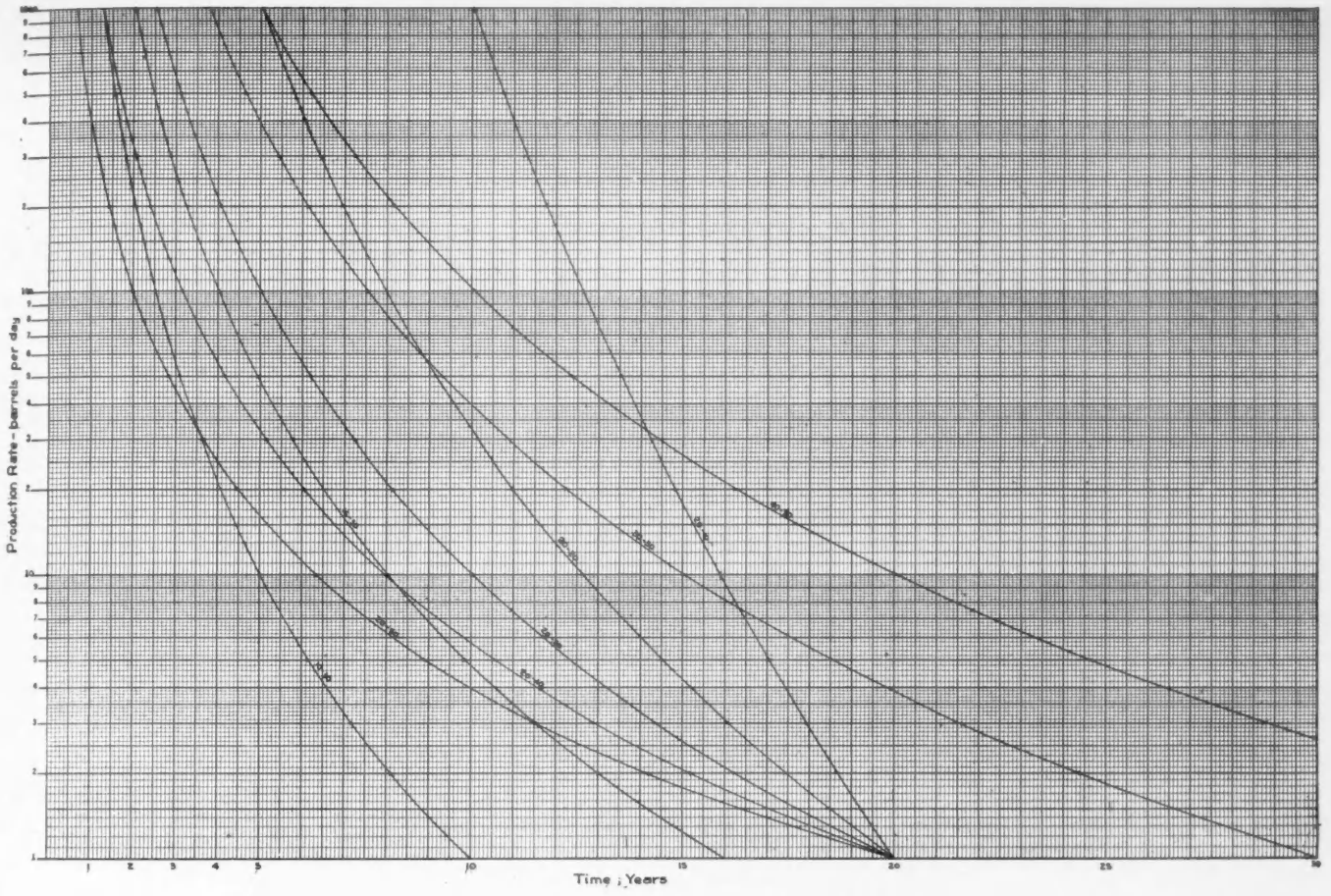


Figure 2. Type hyperbolic decline curves drawn on semi-logarithmic paper. Horizontal scale one inch equals two years; vertical scale production rate in three cycles logarithmic.

a positive slope. When the type curve is selected and the present rate of production known, the future production can be read directly from the curve. This future production, however, is to an ultimate production rate of zero so an economic limit must be chosen and the theoretical production beyond this limit read from the curve and deducted.

The equation for future production from a given rate to an assumed economic limit is

$$A - A_{EL} = Ky^{1-n} - Ky_{EL}^{1-n}$$

and the resultant curve is not a straight line on any common type of coordinate paper.

Similarly, the cumulative production at any given time is the difference between the gross future corresponding to the initial rate of production and the future corresponding to the rate at the given time. For hyperbolic type decline it cannot be represented as a straight line.

In order to use the type curves as drawn from Olds' equations it is necessary to reduce all production rates to barrels per well-day. However, if we consider y_m the monthly rate of production corresponding to a daily rate of y, Olds' decline curve equation can be written

$$x = C(y_m/30)^{-n}$$

Using this equation I have constructed a second set of type curves which is the same as the first set except that monthly rates of production are plotted as ordinates instead of daily rates. In most cases sufficient accuracy for practical purposes can be obtained by using the monthly rate of production, thereby saving the labor of dividing each month's production by the number of days. The same designations are used for the monthly rate curves as for the daily rate curves so that the same future production curves can be used.

In appraisal work it is important to predict the future life of the wells. In using Olds' curves this is very simple. They can be read directly from the decline curves or special curves can be constructed, but it is necessary in each case to determine or estimate the lowest economic rate of production for the well or wells under consideration. Figure 4 shows a set of such curves where an economic limit of one barrel per well-day is assumed. In this case the values of y are plotted as ordinates and values of C - x as abscissae. The same type curves are represented as in Figures 2 and 3.

Arps' Equation

It is interesting to compare Olds' equation with that developed by others. J. J. Arps[2] has analyzed various types of decline curves, among them the hyperbolic type of decline which he recognizes as occurring most frequently. His equation for the time-rate relationship is as follows:[3]

$$P = P_o(1 + bt/a_o)^{-1/b}$$

In this expression, where t equals o for the initial production, it is explained that horizontal shifting to the right over a distance a_o/b is necessary to make the curve a straight line on logarithmic paper. To make the equation comparable to that of Olds' it is necessary to shift the y axis back to the left by the distance a_o/b when the equation becomes

$$P = P_o(bt/a_o)^{-1/b}$$

which may be written

$$F = P_o^b(a_o/b)^{P^{-b}}$$

This is the same as Olds' equation if we substitute:

$$x = F$$
$$y = P$$
$$C = P_o^b(a_o/b)$$
$$n = b$$

Arps' equation for cumulative production is:[5]

$$C = a_o P_o^c/1 - b(P_o^{1-b} - P^{1-b})$$

which in Olds' terminology would be:

$$A_o - A = Ky_o^{1-n} - Ky^{1-n}$$

which is the total ultimate production to a production rate of zero less the future

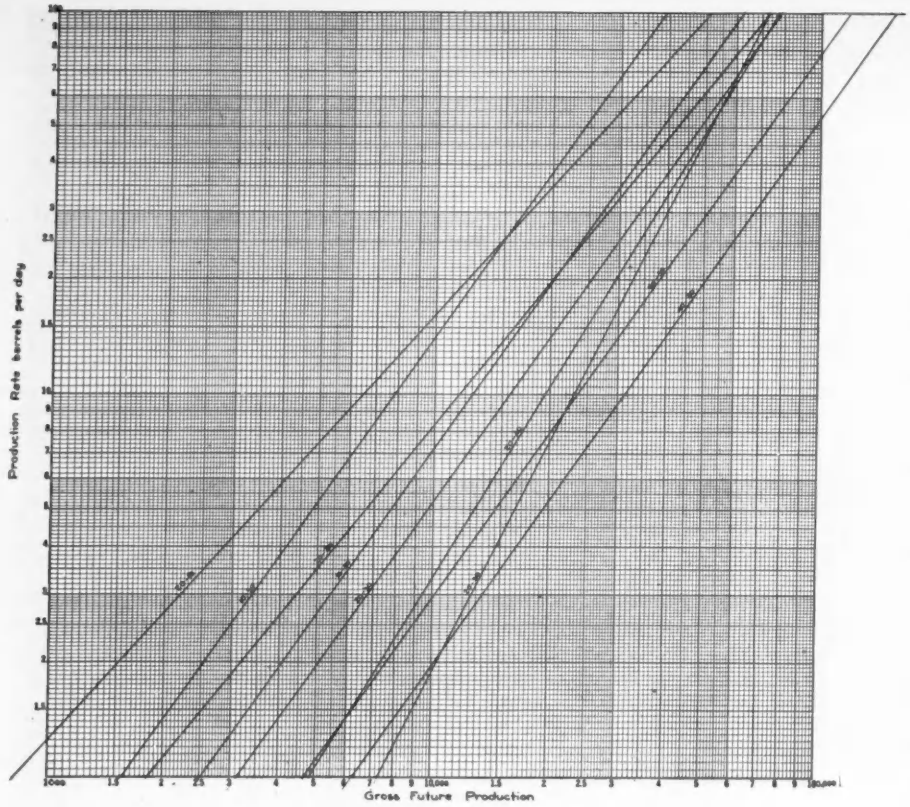


Figure 3. Type hyperbolic future production curves; production rate and future production two-cycle logarithmic. Same basic formulae as in Figure 2.

production for a rate y. These values can be read directly from Olds' future production curves.

Arps[5] assumed from the character of his equations that the behavior of the hyperbolic type decline curve is governed primarily by the value of the exponent b (n of Olds' equation). From Olds' equation for future production

$$A=(Cn/1\text{-}n)y^{1-n}$$

it is obvious that the future production is directly proportional to the value of C and to the expression $(n/1\text{-}n)y^{1-n}$. In order to get some conception of the relative importance of the changes in the values of C and n in determining the behavior of the curves, the values of $(n/1\text{-}n)y^{1-n}$ have been calculated for values of n ranging from 0.1 to 0.7 and for values of y ranging from 1 to 1000 barrels per day. The results are shown on Figure 5 where y values are plotted as ordinates and values of $(n/1\text{-}n)y^{1-n}$ as abscissae. It is apparent that where y is approximately 100 barrels per day different values of n give very little differences in the future production. For values of y above 100 barrels an increase in n results in a decrease in the future production. In general the smaller

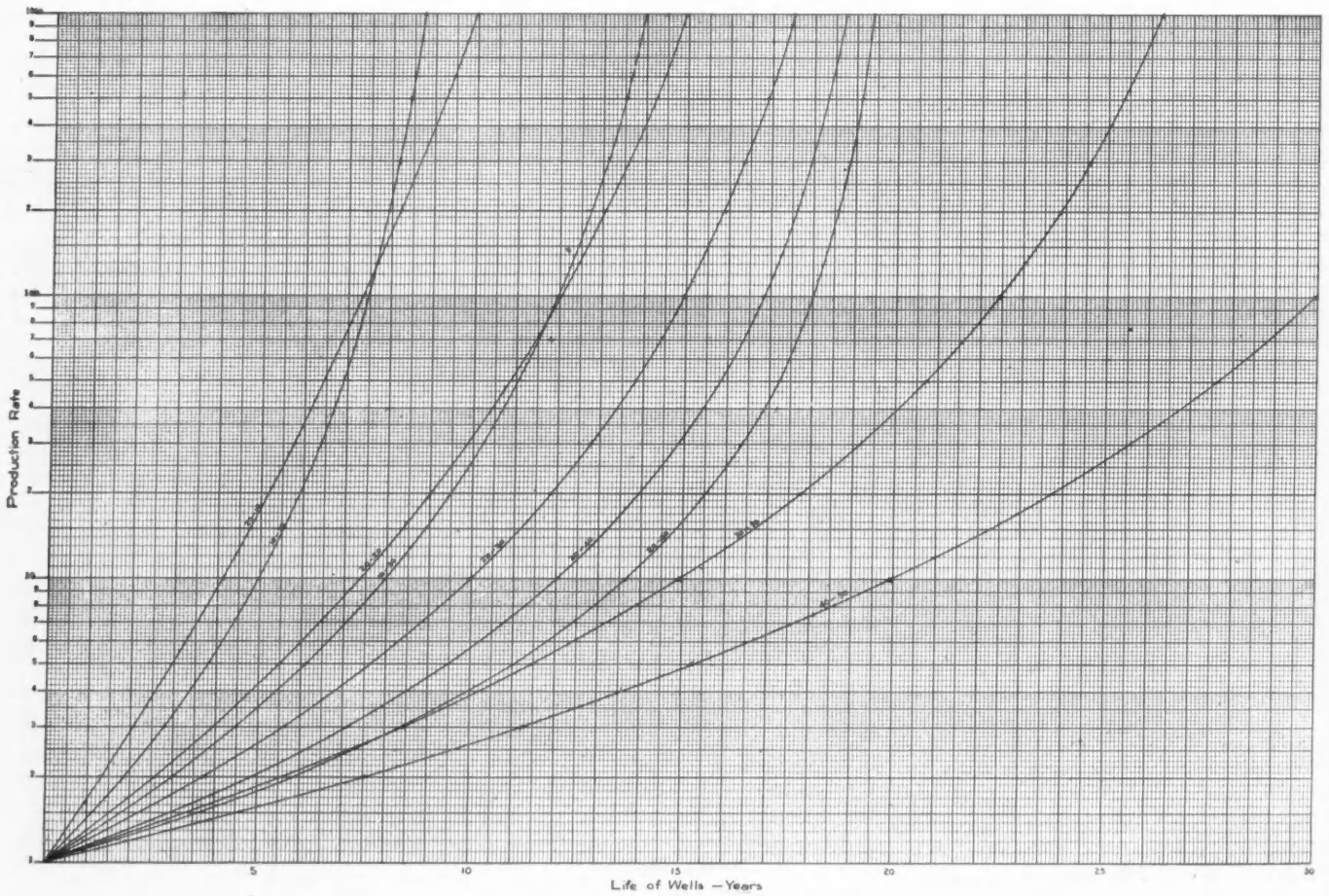


Figure 4. Future life of wells; horizontal scale one inch equals two years; vertical scale production rate three cycles logarithmic.

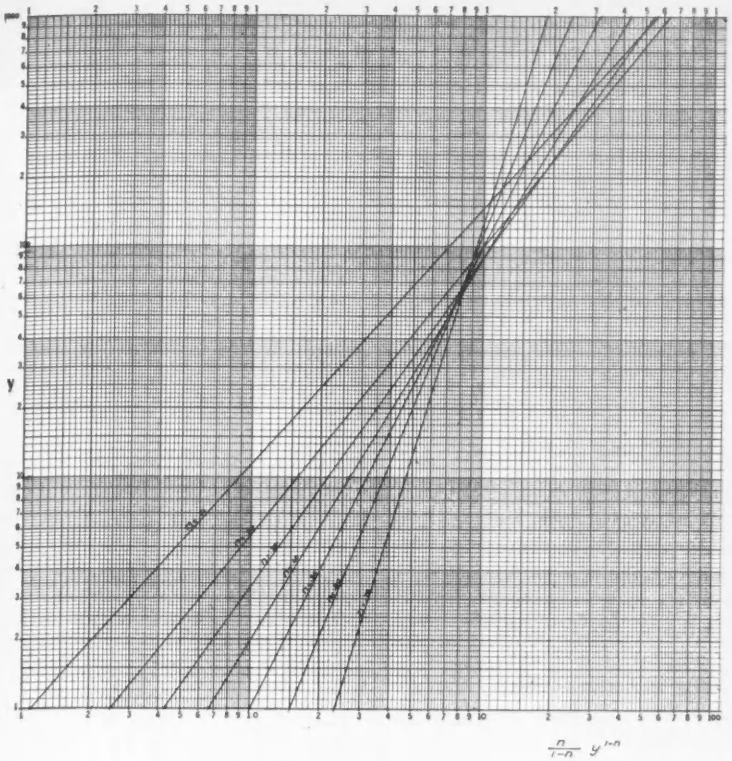


Figure 5. Values of $(n/1-n)y^{1-n}$ for different values of y and n; logarithmic scale y plotted as ordinates and $(n/1-n)y^{1-n}$ as abscissae.

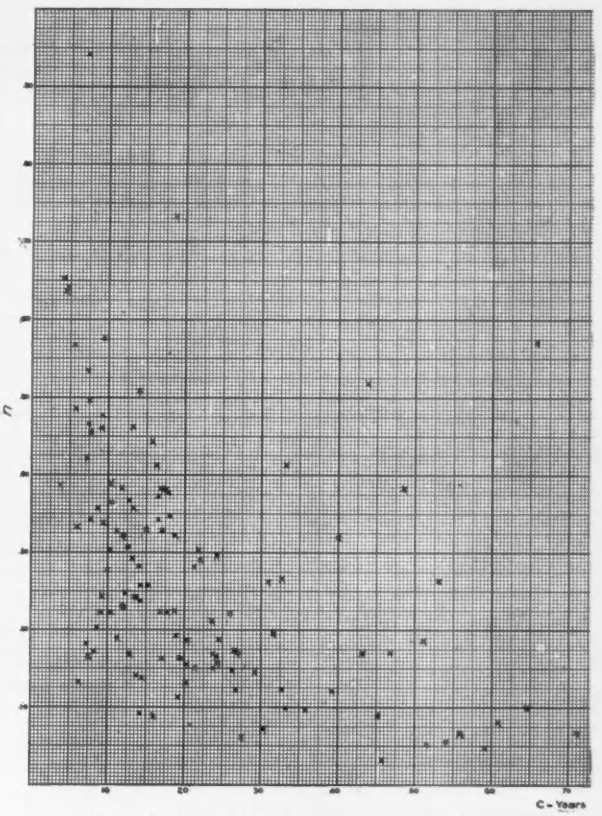


Figure 6. Cutler's hyperbolic decline curves from Bureau of Mines Bull. 228 plotted as values of C and n on coordinate paper. The position of each cross defines a decline curve.

the value of y the more important are the changes in the value of n.

The conclusion is that while the slope of the curve on logarithmic paper is important in determining the behavior of the curve, the position of the curve on the logarithmic grid is even more important.

Cutler[6] in 1924 published the coordinates of a large number of hyperbolic type curves representing the average decline curves for various fields in the U. S. From these data the values of C and n have been calculated and plotted and the results are shown on Figure 6. Values of n are plotted as ordinates and of C as abscissae. Each cross on Figure 6 represents the equation of one of the decline curves tabulated by Cutler and the curve itself can be reconstructed from the position of the cross on the figure. The extreme values of C range from four to 71 years and of n from 0.03 to 0.94. For the great majority of the fields represented, the values of C range from 5 to 30 years and of n from 0.10 to 0.50. In general the higher values of C are associated with lower values of n and vice versa.

The present paper is not offered as a discussion of various types of decline curves. Such a discussion is ably presented in the article by Arps,[7] who summarizes the previous literature on the subject. It is generally recognized that the hyperbolic type decline curve is applicable to the great majority of oil wells, especially in fields which are primarily gas drive in character.

Exponential Type

Many petroleum engineers use the exponential type of decline curve which is a straight line on semi-logarithmic paper because it is supposedly much simpler to handle. Furthermore, with the exponential type curve the equation for cumulative production is a straight line on coördinate paper.

With decrease in the value of n (increase in slope) in Olds' curves the hyperbolic type curves approach the exponential type. For values of n less than 0.10 there would be little error in using exponential curves. As the value of n increases the error in substituting exponential for hyperbolic curves increases. Use of exponential curves in general results in estimates of future production that are too low.

Some other petroleum engineers use what Arps calls the harmonic decline curve, which is the special case of hyperbolic curve where n and consequently the slope of the curve is 1.00. Results are easily obtained because the corresponding rate-cumulative curve is a straight line on semi-logarithmic paper. Use of the harmonic decline curve will in general result in estimates of future production that are too high. According to Arps, only four of the average decline curves listed by Cutler have values of n higher than 0.60.

For the great majority of wells or leases where a rate-time curve can be used Olds' type decline curves offers an easily used and reliable method for estimating the future behavior of the wells under operating conditions that have been used in the past. In order to get reliable decline curves it is necessary that the wells have been produced to capacity under uniform operating conditions over a considerable period of time. In general, this restricts the use to "marginal" wells and others not subject to proration or wells which are prorated to their approximate capacity. Many wells and leases fall in this category especially in the less prolific fields and in those which are nearly exhausted. Careful analysis of decline curves from such properties result in establishing certain of the "type curves" as "average decline curves" for reservoirs which have the same general characteristics. These in turn can be used as a check against estimates made by volumetric methods.

References

[1] Biography of Thomas Hartman Olds, Bull. A.A.P.G., Vol. 16, No. 4 (April, 1932) pp. 435-6.
[2] J. J. Arps' Analysis of Decline Curves, Petr. Dev. & Tech. Trans. AIME, Vol. 160, 1945. pp. 228-247.
[3] Ibid, p. 239, equation 10.
[4] Ibid, p. 239, equation 13.
[5] Ibid, p. 242.
[6] Willard W. Cutler, Jr., Estimation of Oil Reserves by Oil-well Production Curves, U. S. Bureau of Mines Bull. 228, 1924.
[7] J. J. Arps, op. cit.

Torsion Balance Surveys OF INUNDATED AREAS

By K. F. HASSELMANN,
Salt Dome Oil Corporation

DEVELOPMENT of a technique for successfully making torsion balance surveys in areas of shallow water inundation opens up much potentially valuable territory. While some measurements of gravity had been made under water such a procedure was not applicable to relatively shallow bodies of water. After considerable experimentation the writer developed a tripod and floats which have given very satisfactory results. Using the new technique geophysicists have made surveys in the Gulf Coast areas, resulting in the discovery of anomalous subsurface conditions and opening up new production.

DEVELOPMENT of a technique for making gravity surveys in areas submerged by shallow water has opened to this type of geophysical exploration many potential oil sections which otherwise could not have been properly surveyed. In the Gulf Coast area, including Texas, Louisiana, Alabama, Georgia and Florida; in California, Venezuela, the Persian Gulf area, Russia; and in various parts of the East Indian Archipelago, there are vast shallow water areas which are potential oil lands. This technique is not limited to the torsion balance but also could be used with either the pendulum or gravimeter. At least four fields have been discovered as a result of gravity surveys using the technique which will be described below. The torsion balance with this method was used as a reconnaissance instrument, and it is in this respect that gravity instruments can be used most effectively over water.

The need for such a technique was first brought to the writer's attention while engaged in geophysical exploration work in Europe before the war. During the course of survey work in North and Northwest Germany many inundated areas were found where it was impossible to obtain accurate data. Some gravity measurements had been made under water by using a pendulum in a submarine but this procedure was not applicable to shallow water work.

The technique was developed after several years of trial and error in which a number of approaches to the solution of the problem were tried and abandoned. As now developed it is limited to water with a depth of 50 feet or less and to areas which have relatively firm bottom.

Torsion Balance Described

The torsion balance is an instrument which measures the variations in the distortion or warping of the gravitational field. The balance consists of a beam on the ends of which are masses or weights carried at different levels, the complete unit being suspended by a torsion fiber or wire. On the Z-beam balance one mass is carried above the beam, the other below it. Another type, sometimes known as the L-beam balance, carries one mass on the beam and the other suspended below it. A third balance, the inclined beam type, has both masses attached to an inclined beam, thus placing the masses on different levels.

If the gravitational field is not uniform, a difference will be present in the direction of gravitational pull on the two weights, which will set up a horizontal force component on the two weights, causing them to rotate around the suspending wire. The resistance of the wire to torsion reacts against the rotating force until the beam comes to rest at a point of equilibrium.

Because the forces which are measured are extremely minute, the instrument must have a very high order of sensitivity and is, therefore, highly susceptible to vibration of every sort. For this reason, it is necessary that the instrument stand upon a very stable base until the beam comes to rest. This stability is not difficult to obtain for surveys on land, but it was the first and most difficult problem to be solved in the attempt to explore water-covered areas.

It also was recognized that any system adopted must be constructed so as not to introduce any variable distortion of the gravitational field. Of necessity, some distortion would have to be introduced. If this were kept constant it would not affect the resulting data, as the torsion balance is a relative instrument and measures only changes in the gravitational field.

There were three possible solutions to the problem of making gravity surveys of inundated areas. One was to revise the gravity measuring instruments, the torsion balance, the gravimeter or the pendulum, so that they would not be affected by the movement characteristic of a boat or raft floating upon the water. Another would be to invent a new means of measuring gravity which would not be affected by this movement. And, finally, there was the possibility of developing a rigid base on which standard equipment could be used.

The last solution, by far the simplest, had the added advantage that the same instrument could be used either on land or water without modification, whereupon the data from adjacent land and water surveys could be used together without recalculation or adjustment.

In the initial experiments to establish a stable base for the instrument the use of pilings, caissons and underwater concrete structures was tried. For various reasons all proved unsatisfactory and it was then decided to experiment with tripod bases consisting of a light but rigid structure which, presenting a minimum surface to the waves, would be firmly secured in the sediments underlying the ooze.

Three Units

In its completed form the equipment consisted of three units: the torsion balance (any commercial instrument could be used), a tripod on which to place the instrument while a reading was being taken, and a float which not only prevented the waves from striking the tripod but also carried the necessary personnel and equipment. These were supplemented by a power boat for moving and carrying the equipment and for living quarters for the crew. Skiffs were used for general utility work, such as

placing anchors, etc. The necessary surveying was done from a second power boat. Detailed description of tripod and float is contained in U. S. Patent No. 1,983,483.

Survey Procedure

After the necessary equipment had been assembled, plans for the making of torsion balance surveys of underwater areas were put in operation. It was decided, after having made a study of the geology of several inundated areas, to begin actual survey operations in Galveston Bay. The actual surveying may be reduced to four fundamental operations, namely: the location of the stations to be occupied; the actual occupation of the station; moving to the new location; and the computation of the data obtained and plotting it on a map.

In making the initial surveys the location of the stations was made with a small power boat. A predetermined line was established across some part of the Bay. In order to have as accurate a map as possible of the Bay area for the establishment of these lines, aerial photographs were used. When the line had been established by markers, the power boat was run along the line and the stations located by means of 2-x-2-inch sticks long enough to extend above the water level when pushed into the bottom of the Bay. These were marked with flags. The spacing of the stations was determined by running the power boat at a constant speed, determined by a tachometer, for a given length of time. The alignment of the stations was made by sighting on the established markers.

After the stations had been staked out, the precise location of each was determined by triangulation from established points either along the shore or on towers in the water. If triangulation showed that the desired coverage and survey density would not result, individual stations were relocated.

When the stations to be taken had been located, the float was towed into position on the first station to be occupied, and securely anchored. Four anchors were used, one for each corner, and by means of skiffs these were placed as far as was practical from the float in order to get a large horizontal component on the anchor rope. When all four anchors were in position, the ropes were drawn taut so that the float would have a minimum of horizontal movement. Then the tripod was erected in the opening in the center of the float, the tent rolled into position and the balance erected on the tripod. When the balance had been leveled and oriented by means of a compass, a photographic plate was inserted, and the clock and stops properly set. Finally, all tools and loose equipment were removed to the tug boat and the entire crew left the location for the normal eight-hour "reading period."

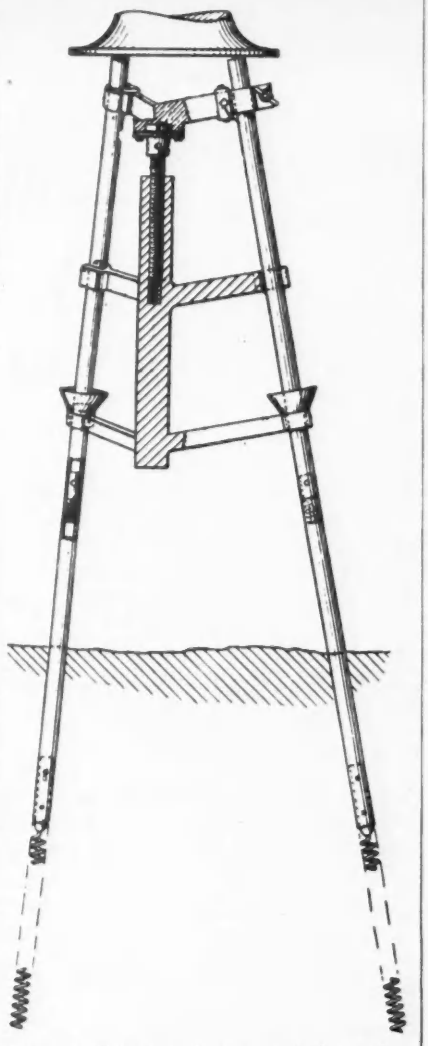


Figure 1. Tripod used to support the torsion balance in inundated areas.

Soundings of the bottom of the Bay around the station were taken from the skiffs, to determine if irregularities were present, and if so, their size and location. In only a few places were any found that required terrain corrections.

At the end of the normal reading time, the boat returned to the float, the stops on the balance were locked in place, the plate extracted, and the balance removed. The tripod then was dismantled, the anchors hauled in, and the float towed to the new location. While the float was being moved to the next station, the observer would develop the photographic plate in a small dark room on the tug boat.

The entire equipment could be dismantled, towed to the new location, and the station completely occupied, with the instrument in position, in about 1½ hours, except in cases of long moves or other unusual situations. Therefore, each party was equipped with two torsion balances, tripods, and floats. The operations were so organized that one instrument would be moved while the other instrument was in position.

The data were computed by the usual method, which has been adequately described in the literature. In one respect the computations were simpler than those used in land surveys, for in only a few cases was it found necessary to make terrain correction.

Limitations of Apparatus

The equipment for making torsion balance surveys of shallow water areas was found to have limitations based upon the water depth and the nature of the bottom. For instance, the construction of the tripod was such that it could not be used in less than about four or five feet of water unless the mandrel, which is nearly five feet long, was left off. As the tug boat used to tow the float drew about four feet of water, no attempts were made to carry the work into areas of less than that depth. However, by using a smaller boat and a shorter mandrel, there is no reason why the work could not be carried into relatively shallow water.

Deep water presented a different problem. Experience demonstrated that about 50 feet of water was the greatest depth at which the equipment could operate. In deeper water, the legs of the tripod extended so far below the mandrel that buckling tended to develop. However, it is the writer's opinion that surveys can be made in waters of even greater depths than those encountered to date by using a larger float, heavier legs on the tripod, and a longer and heavier mandrel.

The cost of making torsion balance surveys of under-water areas is on the average greater than surveys of similar density on land. Boat operation is not only more expensive than truck operation, but also requires a larger personnel.

Gulf Coast Results

Fairly complete reconnaissance surveys and some localized detail surveys were made in Galveston Bay in Texas and Barataria Bay in Louisiana. In Galveston Bay, eight major and several miner gravitational anomalies were discovered. In Barataria Bay three outstanding anomalies were found.

All of the eight anomalies on Galveston Bay were detailed with the reflection seismograph. Definite evidence of structure was found associated with seven of them, with some indefinite evidence of structure on the eighth. Six of the anomalies have been tested with the drill. Production has been established on four of these, Cedar Point, Fishers Reef, Smith Point and Double Bayou. On the

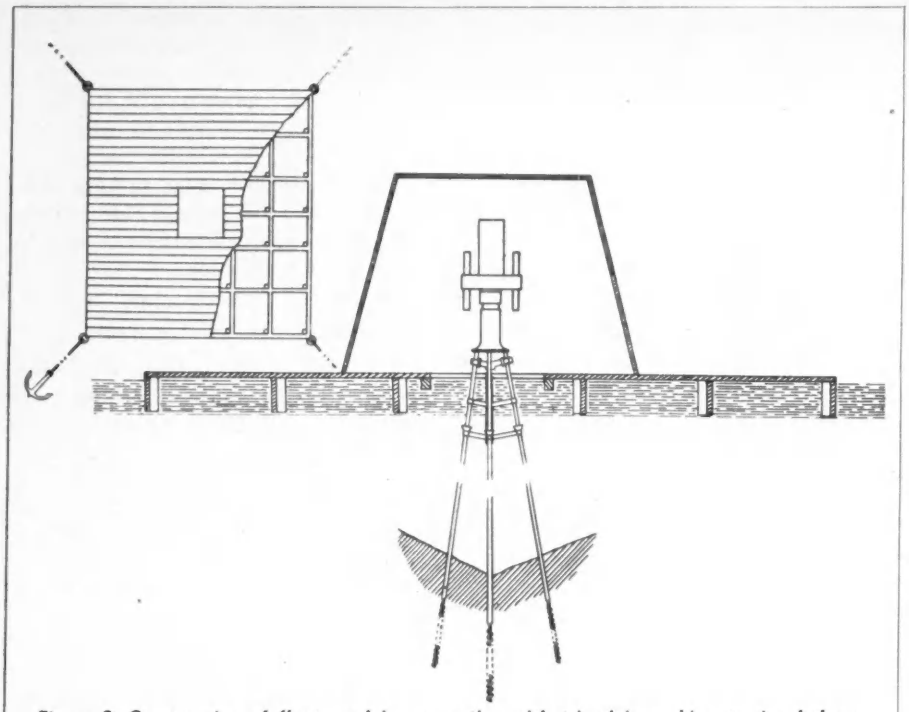


Figure 2. Construction of float used in connection with tripod in making torsion balance surveys of inundated areas.

other two anomalies, four dry holes have been drilled at Marsh Point and two at Elm Grove without establishing commercial production. At both prospects, the upper sands were poorly developed. Because of heaving shale, the Frio section was not reached by the drill, and so these two prospects present as yet untested possibilities. After the anomalies were discovered on Barataria Bay leases could not be secured, and so no detail reflection seismograph surveys were made.

Relative Dependability of Surveys

The question naturally arises as to whether torsion balance surveys made by the above described method are as dependable a measurement of the variations in the gravitational field as are similar surveys on land. The only way this question could be answered definitely would be by making a survey over a water-covered area, and then removing the water and repeating the survey, using the same station positions. This, of course, is impractical.

However, an indirect approach may be made to the problem. One criterion of the relative merit of water and land surveys is whether the water taken data can be tied into and used with land surveys without adjustment or correction. The writer supervised the survey of Galveston Bay, covering approximately 300,000 acres, and a land area of similar size, surrounding and adjacent to it. In the exploitation of these data, at no place was it found necessary to make any correction or adjustment of the values taken over the Bay, nor did any discrepancy in the expression of the gravitational anomalies occur along the shore line where the two surveys joined.

About the Author

K. F. HASSELMANN, president of The Salt Dome Oil Corporation, is a pioneer in Gulf Coast marine development. A native of Iowa, he received his technical training at the Missouri School of Mines and Metallurgy, receiving his B.S. and E.M. degrees in 1925 and 1945, respectively. While a student Hasselmann worked as a roughneck in the Oklahoma oil fields. After graduating he became associated with The California Company as field geologist in West Texas. In 1927 he joined Sinclair Exploration Company and was sent to Germany as chief geologist. In 1929 he became general manager of the North European Oil Corporation with headquarters in Berlin, Germany. Upon his return to this country in 1933 he became president of Geophysicists, Inc., and engaged in extensive geophysical surveys. That company was merged with The Salt Dome Oil Corporation in 1934, at which time he was elected president and director.

One of the greatest sources of error in torsion balance surveying is the terrain correction made to compensate for irregularities in the surface in the vicinity of the balance. In the vast majority of the stations taken in Galveston Bay and Barataria Bay, soundings made around the instrument indicated there were no irregularities in the bottom which would have a gravitational effect sufficient to deflect the instrument. This was not only because the bottom of the bay was very smooth, but also because the difference between the specific gravity of water and those of the bottom sediments of the bay was much less than between the surface soil and air. Therefore, an irregularity of a given size on the bottom of the bay would have a much smaller effect on the instrument than would an irregularity of the same size on land.

This view has been borne out by the writer's experience. In work with the torsion balance in Northern Germany and on the Gulf Coast, the writer has found that often, in spite of the most careful measurements of the terrain, erratic values periodically occur. On glacial deposits in Northern Germany, these erratic values were commonly found to be due to local accumulations of gravel. Similar local gravel deposits, though of a different origin, occasionally were found on the Gulf Coast. These accumulations were often so completely concealed that they were found only by digging or shallow coring around a station which gave an erratic or unusual value. Other gravel deposits, small enough or far enough away from the instrument to give only a slight effect, must have modified to some extent the data from many of the other stations.

In the torsion balance surveys of water-covered areas made by the writer, no such irregularities were found. Except around Red Fish Reef, the bottom was found to be so flat and featureless that no terrain corrections whatsoever were needed. In the Red Fish Reef area, great holes had been dug in the bottom of the baby by dredges digging up oyster shells. These holes had to be carefully sounded so corrections could be made for them in gravity data taken near by.

Where the terrain is favorable, the average land crew can occupy three stations per instrument per working day. The work on water is slower than this because of the time consumed in pulling in and placing the anchors, and in dismantling and erecting the tripod. Also a boat towing the float moves only about one-sixth as fast as a truck on good terrain. The time necessary to erect the instrument, take the reading, and dismantle the instrument is the same on water as on land.

THE question of a U. S. national oil policy affects the American domestic operator and the American oil operator abroad, alike. It affects the stockholders, the officers, and every other employe.

What happens in oil in the U. S. A. affects operations abroad. What happens abroad affects the purely domestic operator.

That is why we are presenting herewith the final report of the U. S. Senate committee (O'Mahoney Committee). If you are in the oil business you ought to read it. The footnote comments are our own.

Recommendations on U. S. National Oil Policy

Part 2

It is appropriate here to repeat that in time of peace a nation, to maintain a first-class rating in the trade and commerce of the modern world, must have access to an abundant supply of oil because mechanized industry and transportation depend upon it. Oil is also of basic importance for purposes other than the provision of energy. Petroleum lubricates the fleets, airplanes, and machines of the world. It is a raw material in the whole field of chemicals. It is used in the manufacture of pharmaceutical products, paints, solvents, plastics, and synthetic rubber. It is used as fuel for domestic comfort and for heating generally, on an ever-growing scale.

Furthermore, in time of war, as twice demonstrated on a large scale in the present century, a nation, to remain a first-class power, must have petroleum resources immediately and continuously available in virtually unlimited volume. Oil is the *sine qua non* of military victory.

Critical Factor

Although future developments of atomic research may eventually result in supplanting some or many of the peacetime applications of petroleum, an industralized nation cannot in the immediate nor perhaps in the distant future dispense with oil both for fuel and lubricating use. *Moreover, despite the prospect that the military application of atomic fission may render future war briefer and still more catastrophic, a nation in relying solely on the atomic bomb, either for offense or defense, would court disaster. If the use of atomic bombs by one or by both belligerents did not terminate the struggle, the supply of oil might again prove the decisive factor.*

Therefore, as a basis for a sound national petroleum policy, the extent and location of our proved oil reserves, their productive capacity, and our domestic requirements must be considered.

However sanguine may be the hopes of geologists derived from historical trends of discovery, or however likely may be the presence of petroleum in untested areas, it would be unwise to rest conclusions for present purposes upon any premise other than "proved" reserves as that adjective is understood by the American oil industry. If present estimates of future productive possibilities are later demonstrated to have been conservative, our national oil policy could be readily adapted to the happy plentitude of supply. If the future proves less roseate, our policy will have run concurrently with the facts and the nation's security will not have been adventured.

1. *Prived reserves within continental United States.* The latest (December 31, 1945) estimate by the American Petroleum Institute is 20,826,813,000 barrels of crude oil recoverable under existing operating conditions. Although since 1936 the total estimated reserves have shown an annual increase (with the exception of 1943), this has been owing chiefly to extensions to existing fields and revisions of former estimates, the reserves of new pools discovered each year having of late been far below annual production. Of course, this trend may be reversed by the discovery of one or more great pools, but it is noteworthy that despite greater exploratory effort, increased and deeper drilling, and improved technology, the estimates of reserves found in new fields in 1945 are still less than the annual civilian consumption. Some American authorities, however, are more optimistic in their estimates of the quantity of oil which may be discovered in the United States. They assert that this country "should ultimately yield at least 100 billion barrels of oil, including the 44 billion barrels already discovered."

2. *American interest in foreign crude reserves.* Although data comparable in accuracy to estimates of United States domestic reserves do not exist in respect of foreign areas, the total proved reserves outside the United States have been estimated at 43,319 million barrels, of which about 40.1 percent, or 17,371 million barrels, represents our position as of January 1, 1945. Of these reserves about 5596 million barrels are located in the Caribbean region (Venezuela, Colombia, and Trinidad); about 11,136 million in the Near and Middle East; and the remaining 639 million are distributed in Oceania, Europe, and the Western Hemisphere outside the Caribbean.[6]

Productive Capacity

1. *Fields within continental United States.* Crude oil production for the year 1929 reached a peak slightly in excess of 1 billion barrels. This total was not attained again until 1936. In 1940 the annual production was about 1350 million barrels. During the war the total rose in 1945 to a figure in the neighborhood of 1711 million barrels. At the time of the formal entrance of the United States into the war in 1941, this country had an efficient productive capacity of approximately 4650 million barrels daily. The maximum efficient rate of production began to be exceeded in mid-1944; by mid-1945 the maximum efficient capacity was being exceeded by approximately 300,000 barrels per day. During the war the proved reserves within the United States were produced at the average rate of nearly 7½ percent per year. In 1946 the production is reported by the Bureau of Mines to have exceeded 1730 million barrels. The bureau estimates a total production of 1746 million barrels for the current year.

2. *Foreign fields owned by or under concession to United States nationals.* In 1939 the American share in foreign production totaled approximately 554,000 bar-

[6] See *World Oil Atlas*, 1947 Edition, for later estimates for reserves, by countries.—Editor.

rels daily, about 441,000 barrels thereof being produced in the Western Hemisphere, principally in the Caribbean area. It is to be anticipated, however, that a rapidly increasing American production will flow from the extensive reserves in the Middle East.

During the recent war the known foreign reserves, American and other, on the average were drawn upon at the approximate rate of 2 percent per year. In August, 1945, total foreign crude production (excluding Axis and Russian areas) attained a peak of 1,900,000 barrels daily.

Domestic Petroleum Requirements

In 1938, the last normal prewar year, domestic requirements, civilian and military, were 3,115,000 barrels per day; only three years later the 1941 domestic requirements were approximately 4,070,000 barrels daily. During the war, even with civilian rationing, production from reserves within the United States was increased to a peak of 4,890,000 barrels per day for the month of July, 1945. In 1946 the demand exceeded even the wartime requirements.

Forecasts presented to the committee in October, 1945, indicate a domestic demand in 1950 of 4,955,000 barrels per day, gradually rising to 5,735,000 after 1960. However, since these estimates were made, new forecasts indicate a peacetime demand as high as 5,400,000 barrels daily in 1950; 5,650,000 in 1955; and 5,850,000 in 1960.[7] All these forecasts are made on the assumption that the United States will not engage in war during the period.

National Policy in the Past

For some time after the discovery of oil by Drake in 1859 the production and sale of oil were essentially local in scope. No problems immediately arose of a nature to concern the Congress. Under the stimulus of private initiative the industry expanded as the years went by and as the demand for oil increased. During this period, and even in more recent days, it could hardly be claimed that there was a conscious or comprehensive national petroleum policy. To be sure, in the twentieth century the principle of the decision of the Supreme Court in the Standard Oil Case, applying the Anti-trust Act to combinations in undue restraint of interstate trade in petroleum, has been generally accepted. The principle of the Mineral Leasing Act of 1920, under which the federal government retains ownership of oil lands on the public domain, although leasing them for development and operation by private industry, has likewise been accepted, as has federal legislation a) prohibiting interstate shipment of petroleum produced in contravention of state law, and b) consenting to compacts among the states to prevent wasteful production. Moreover, the Congress, recognizing that production costs were deterring the manufacture of synthetic liquid fuels, recently authorized the Department of the Interior for a limited time to construct and operate demonstration plants for the production of such fuels from coal, oil shale, and agricultural and forestry products. Nor has the nation been without a foreign petroleum policy, sometimes more successful than at other times, based upon the principle of the "open door."

The following generalizations may perhaps be made in respect of the historical development of the American oil industry:

1. The industry has been owned and operated by private enterprise, with a minimum of regulation by government, either federal or state;

2. A competitive system with opportunity for small operators to establish themselves, to prosper, and to expand, has been regarded as the ideal;

3. Integration of the various branches of the business—production, refining, transportation, and markteing—has not been prohibited, with the result that some 21 efficient companies with strong financial resources have become capable of operating throughout the United States and 14 of the same companies also operate in many foreign areas;

4. No impediments have been created by the federal government to exploration and production abroad. The "open-door" policy has been recognized in principle, and although foreign development has been for the most part undertaken by the operators on their own initiative and at their own risk, they have, in increasing degree, sought the cooperation of the Department of State;

5. Under the Webb-Pomerene Act, American companies have been permitted to operate freely abroad in accordance with the economic and legal conditions there confronting them, so long as the antitrust laws of this country have not been violated;[8]

6. Foreign companies have been allowed to qualify to do business in the United States, and to lease public lands therein, provided American companies were granted reciprocal privileges;

7. Except in the case of public lands, the conservation and production of petroleum, including natural gas, within the United States have been left to the jurisdiction of the state governments, with supplementary federal legislation to forbid the interstate shipment of petroleum produced in violation of state law, and to authorize interstate compacts for prevention of waste;

8. Because oil, like other minerals, is a diminishing resource, and because investments incident to exploration involve unique risks with danger of large financial loss, the Congress through income-tax provisions has allowed deductions for depletion and intangible drilling costs;[9] and

9. The development of domestic resources by domestic companies has been regarded as worthy of protection against imported oil.

American Know-How

On the basis of the industrial practices and state and federal law thus far evolved the American oil industry has developed a technical "know-how" that is matchless. Proved reserves which in 1918 were only 6200 million barrels climbed to 20,826,813,000 barrels in 1945. From a daily average production of crude in 1918, a war year, amounting to 975,000 barrels from 203,000 wells, the daily average rose by 1938 to 3,327,000 barrels from 369,000 wells. At the same time the average price, at the service station, of a gallon of gasoline declined from 25.1 cents in 1918 to 12.75 cents, excluding tax, in 1940.[10]

Meanwhile the utility of oil for a wide variety of civilian uses became more and more apparent. The internal-combustion engine was improved. Road-building programs covered the continent with a network of good highways. The motor industry developed the mass production of automobiles.

The oil industry met the challenge. *Per capita* consumption increased from 36 gallons a year in 1900 to 367 gallons a year in 1938. In 1918 the refining capacity was 1,186,000 barrels daily of crude oil against about 5 million barrels at the present time. In 1918 the mileage of trunk and gathering crude-oil pipe lines total 55,000 in contrast to the present network of 141,000 miles. The United States tank-ship fleet grow from 145 oceangoing vessels of 2000 gross tons or over in 1918 to 382 in 1938 and to 907 on September 1, 1945. In 1912 the share of American companies in all foreign crude-oil production was 8.4 percent; in 1938 it was 23.8 percent. On January 1, 1945 the total foreign reserve

[7] Demand has been growing so rapidly that even estimates on the 1947 demand, made late in 1946, have been found entirely too low, just as was the case the preceding year. An oil economy for Europe is playing havoc with prior estimates.—Editor.

[8] In at least one country an American company, in partnership with a company which in turn is in partnership with a foreign power, finds itself an unwilling partner in a cartel which it would like to see terminated.—Editor.

[9] Incidentally this depletion clause is constantly under congressional or Treasury Department attack, and should such attacks be successful, the blow at the industry's effort to provide domestic oil, would be a deadly one.—Editor.

[10] Here is a well-earned tribute to the American oil industry, and a tribute to private enterprise as well.—Editor.

(proved) of American companies was 17,371 million barrels or about 40.1 percent of all foreign reserves. In 1938, the last normal year, United States production was 60.6 percent of world production; and during the war years 1941-1944 nearly 65 percent of the world's estimated total production was supplied from wells in the United States. With only 6 percent of the world's land surface the United States for the last 40 years has produced annually more than one-half of the world's total supply of crude.

A petroleum program that has yielded these magnificent results would seem to require no radical change. On the other hand, this country may not wisely conclude that the wells will never run dry, nor that the reserves which its explorers have discovered abroad will always be available. Considerations of national security demand everlasting vigilance. In this troubled world, which has not yet learned how to avoid war, the oil policy of this nation while at peace must nevertheless be governed by the inexorable demands of self-preservation.

National Defense

If the United States should become engaged in a war waged wholly on partially outside its boundaries, the availability of oil from American reserves near the foreign theatre of hostilities would be advantageous. To the extent that the war were waged within or near the continental United States, the reserves within this country would be of paramount importance.

It should not be assumed that all future warfare will occur beyond our boundaries. If invaded we would naturally rely first upon local oil reserves. If production from these were inadequate and if the United States controlled the sea, supplementary oil might be imported. However, it should not be assumed, particularly in the light of our experience with hostile submarines off the Atlantic coast in the last war, that the United States would at all times be in control of the routes between our ports and our petroleum reserves situated abroad. This is not to imply that American petroleum interests abroad should receive only lukewarm diplomatic protection, or that we should not emphasize exploration and development of our concessions in other lands. Quite the contrary should be our policy because those reserves will add to prosperity in time of peace and may under certain conditions of warfare be highly useful. *But, in the final analysis, the reserves within our own borders are more likely than not to constitute the citadel of our defense.*

It follows that nothing should be done to weaken the productive capacity of domestic reserves, and that every possible step should be taken both to increase these reserves and continuously to develop them to such a degree as would occasion no regret in the event of war.

If the nation during wartime were called upon to supply all its military and essential civilian requirements from reserves located in the United States, and if the war were conducted on a large scale, the task could not be accomplished from the reserves now known. The presence of proved reserves in excess of 20 billion barrels does not mean that a mere turn of the valves will yield production in any desired amount. There is a limit at which a given supply can be made available. Thus, it is a physical impossibility, even disregarding maximum efficient rates, to produce say one-fourteenth of the reserve supply annually for 14 years. Many an old well, now giving up but small quantities each day, is expected to produce for 20 years to come. The oil will not flow out of the reservoir rock any sooner. Moreover, the nation no longer enjoys the comfortable margin between production and productive capacity prevailing in 1941.

To say that imports from the Caribbean area can be utilized in wartime by virtue of our control of the Caribbean is too hazardous a program.[11] Our naval bases and tankers are subject to destruction, to say nothing as to the possibility of attack on the foreign petroleum fields themselves.

The answer is to be found in synthetic production. Synthetic gasoline can be produced from natural gas at costs similar to present costs of producing domestic gasoline from crude petroleum. Oil shale and sub-bituminous coal and lignites also can be utilized to produce gasoline and other liquid fuels at a cost which research has already reduced from 14 to about 8 cents per gallon above that of producing gasoline from crude. These sources of supply, it is estimated, are capable of meeting all domestic petroleum requirements for many centuries. In view of these facts it is folly to be apprehensive that this nation is facing a shortage of liquid fuel. But it behooves the nation as soon as possible to take bold steps in the direction of synthetic production so that such production can become readily geared into the oil economy.

Until such time as synthetic production costs are not in excess of those of production from crude oil, there will be a natural temptation in peacetime to meet domestic deficiencies with imported petroleum. But to the extent that the volume of imports is permitted to grow during such period, the nation-wide industrial plant necessary for synthetic production will fail to emerge through private investment. This is not to say the manufacture of synthetic fuel should be fostered by a governmental policy designed to force prices up, thereby rendering such manufacture commercially profitable, but rather that the Bureau of Mines should continue to build and operate demonstration plants, and to conduct research, pursuant to the authority conferred by the Act of April 5, 1944, to the end that the transition may be made promptly at the appropriate time.

Prior to the transition, it must ever be borne in mind that crude reserves in the ground, no matter how vast, are useless in an emergency unless they are producible to meet the emergency. It requires killed manpower, expensive equipment, and a long period of time to drill an oil well. Moreover, daily yields are physically limited in volume. After the oil reaches the surface it must find transportation by pipe line, tanker, barge, tank car, or tank truck, or by a combination of these. Then it must be refined, and the various products thereafter distributed. To do these things upon arrival of emergency requires that certain conditions exist during the period prior to the emergency. Thus, laboratories of research must be maintained; geological and engineering expertise must uninterruptedly progress; wildcat drilling must flourish; patient exploration must take place; and an industrial *esprit de corps* unhampered by governmental or monopolistic encumbrances or restraints must illumine the whole.[12]

---

[11] On the other hand, such reserves can be more readily defended than reserves in more exposed locations. Any national oil policy which does not recognize this will fall short of its aims.—Editor.

[12] Herein lies the basis of a national oil policy insofar as domestic production is concerned. A sick domestic industry would be fatal to our defense, should another great war come. See *The Oil Weekly* of February 10, 1947, page 253.)—Editor.

The Riddle Is Solved!

Beneath the prolific oil pools of Barton County, Kansas, lie the six buried pre-Cambrian quartzite hills which had their origin more than 550 million years ago. Few geologic features in the Mid-Continent area have attracted as much interest or study. Now the riddle has been solved. In "Buried Pre-Cambrian Hills in Central Kansas," Dr. Robert F. Walters, research geologist, Gulf Oil Corporation, traces the geologic history of the buried quartzite hills.

Watch for it in an early issue.

OIL —Its Origin and Accumulation

By DR. F. M. VAN TUYL and DR. BEN H. PARKER
Colorado School of Mines, Golden, Colorado

Part 2

ONE of the most fascinating riddles that remains unsolved in the realm of pure science concern the origin and accumulation of oil. Despite the pivotal position which petroleum has assumed in the progress of modern civilization, those engaged in the business of finding and producing it are uncertain as to how it was formed and as to how it got there in the first place. The general public depending on petroleum and its derivatives knows even less concerning the origin of oil. This presentation, therefore, is designed to stimulate renewed interest in a problem which is of more than academic import. The more that is known about the origin and accumulation of oil and gas the easier it will be to find it.

Lateral Vs. Vertical Migration—its bearing on the problem. It is not necessary to assume that extensive migration of oil and gas, either laterally or vertically, is required to give rise to commercially important pools of oil and gas. Local rich accumulations of source material in sediments may be transformed to oil and gas, which may undergo but little readjustment to produce commercial deposits. However, it is well established that both lateral and vertical migration may play important roles in the accumulation of oil and gas. The degree of importance of each type of migration must vary widely in individual instances. In order for large volumes of oil to move through fissures it is obvious that there must also be some lateral movement of the fluid towards these openings.

Some of the better-known examples of vertical migration represent leakage of oil along fissures from deeper-lying accumulations.

The prevailing conception of vertical migration requires the movement of hydrocarbons through crevices formed after the consolidation of the strata involved. This should be revised to embrace the possibility of substantial upward movement of oil and gas during the compaction of sediments in which they may be generated.

The greatest compaction takes place in the deeper portions of sedimentary basins. Gases and fluids tend to be driven from the strata in the directions of least resistance, which are upward into less consolidated formations and laterally towards the borders of the basins. It is believed that the greatest lateral movement is along the more porous beds such as sandstones. Thus, during sedimentation the direction of movement of fluids and gases tends to be the reverse of that which takes place after consolidation has occurred and exposure of the strata is accomplished through uplift and erosion.

Several examples of comparatively recent vertical migration of oil have been cited in the discussion of this question. Perhaps in some the oil is being generated as migration proceeds. A more conservative interpretation would regard the generation as of earlier age, the transcending of strata occurring after some preliminary concentration.

Comparison of barren and productive structures. Additional facts should be compiled and published regarding any variations in thickness and other characteristics of formations as they pass over proven oil structures. Critical comparisons of sections penetrated over barren and nearby productive upfolds of similar type ought to be particularly helpful in determining criteria for predicting the value of untested areas in the vicinity. This is particularly true where variations are directional.

The study of variations in the composition of the waters of the more important oil and gas horizons presents many possibilities, but much remains to be done in such an investigation. It is necessary that we learn more about the "shows" encountered in testing reservoirs not found to contain oil and gas in commercial quantities. Perhaps some of these represent remnants of large accumulations that have been lost as a result of flushing or some other cause. Additional experiments on the flushing of oil from sands should assist in solving some of the problems involved in the proper interpretation of this phenomenon.

In several petroliferous areas where barren domes and anticlines occur, a greater thickness of certain formations has been observed over these sterile folds than over adjacent productive folds of similar magnitude, thus implying that the latter experienced certain early positive impulses which the others did not. It is generally agreed among students of Mid-Continent geology that the structures of more complex history are not only more often productive but when oil-bearing contain more oil than those of relatively simple origin.

This relationship is evidently more characteristic of areas in which a relatively thick section involving several geologic systems appears than of areas in which only one or two systems are involved.

Too Vigorous Circulation

In regions of extensive artesian circulation such as the Rocky Mountain area, waters in reservoir horizons of barren structures around the borders of basins are less saline than the edge waters of productive structures in the deeper portions of the basins, thereby implying either a circulation too vigorous for oil and gas to be impounded or the flushing of former accumulations of hydrocarbons. Inasmuch as the circulation was undoubtedly more vigorous in the earlier history of the area when the reservoirs lapped higher on the flanks of the adjacent mountain ranges, a too-vigorous circulation appears to be the more plausible explanation. A more careful examination of samples of "dry" reservoir horizons in favorable structures for traces of oil should reveal instructive data regarding the point at issue.

Evidence furnished by salt-core structures. The deep-seated types of productive salt domes, which have not affected materially the thickness of the Miocene and younger formations, are not a promising source of information regarding the problem of the origin and accumulation of petroleum. On the other hand, some of the shallow domes, which show evidence of pulsatory uplifts extending into Pleistocene or Recent time, should be reexamined with this subject in mind. Perhaps the time of accumulation of oil can be dated in several of these, particularly where faulting of known age is

related to the oil pools, as in the Raccoon Bend field described by C. R. Teas and L. P. Miller.

Such data, together with deductions based upon the character of the oil as brought out by Barton, favor the view that the generation and accumulation of the Gulf Coast crudes occurring in the flanking and supercap sands took place during or not long after the deposition of the sediments immediately associated with the oil reservoirs. The cap-rock oils evidently had a more complex history.

Origin and import of bituminous rocks. The origin of most of the occurrences of bituminous rocks is not open to question. Their field relations indicate that they represent either: (1) fossil oil fields; or (2) impregnations resulting from the leakage of petroleum from nearby accumulations. However, it has been demonstrated by field observations that crude oil, bitumen, and bituminous sands may be deposited directly in sedimentary accumulations. In the vicinity of the exposures of the Athabasko tar sands of Alberta, reworked Pleistocene deposits of bituminous sands as much as 15 feet in thickness have been reported. Asphalt may be washed in by the sea and deposited in the near-shore sands or limestones as on the Atlantic beach of Florida and the Gulf beach in the Corpus Christi area.

The importance of the phenomenon of direct precipitation of petroleum concurrently with sediments as a result of the release of large quantities of hydrocarbons through the truncation or faulting of oil traps remains to be determined. Discontinuous, spotty impregnations of sandstones and limestones with bitumen, which appear to be the rule rather than the exception, do not favor this mode of origin. More field and laboratory studies will have to be undertaken before this question is satisfactorily solved.

Perhaps some bituminous rocks suspected of being of primary origin have resulted from the conversion of organic matter originally contained in them to oil which was later inspissated, or even into bitumen directly. The paucity of possible source material or of fossils in outlying, unaffected areas in some occurrences for which this origin is postulated weakens the plausibility of this explanation. Other objections have been raised by John L. Rich.

The bituminous sandstones and limestones, for which an indigenous source of the oil, or of organic material from which it was derived, is postulated, merit further study both in the field and in the laboratory. If it can be demonstrated that certain of these deposits are primary, the problem of the time of origin and accumulation of petroleum will be well advanced towards solution. The burden of proof, however, appears to be on those who advocate the "in situ" theory.

If it is possible for bituminous limestones and sandstones to be formed by the deposition of bitumen or its source material simultaneously with the sediments why should not ether-soluble material be found in larger quantities in shales and clays, which constitute the preponderant types of sedimentary rocks?

Meaning of accumulations under asphalt seals. The time of oil accumulation with reference to the time of truncation of asphalt-sealed reservoirs generally cannot be determined. In areas that have experienced profound erosion the occurrence of oil under asphalt seals far out on both flanks of an anticline, below the lowest closing contour of the sand involved, would furnish strong evidence of accumulation subsequent to bevelment.

Significance of Burned Zones in Monterey Formation. It appears that many of the burned zones of the Monterey and Sisquoc formations of California have resulted from the burning of oil shales containing bitumen rather than of oil sands. The evidence presented favors the view that the combustion of the bituminous sands and shales took place in their late geologic history after their upturning, truncation, and exposure to the air. The burned zones, therefore, do not promise to throw much light on the time of origin of petroleum. The oil shales with free bitumen should be reexamined, however, with the object of determining the source and mode of origin of their bitumen content.

Oil and Gas In Crystalline Rocks. The presence of solid and tarry hydrocarbon-bearing minerals in pegmatites and in veins of pre-Cambrian ore in the Canadian Shield area suggests that some bituminous substances may be of ancient age. It cannot be determined whether they are inorganic or whether they were derived from associated metamorphosed sediments.

The existence of small amounts of inflammable gas, largely methane, in pre-Cambrian crystalline rocks hundreds or even thousands of feet below the surface at widely separated localities lends credence to the view that this substance not only has been formed in pre-Cambrian time but has withstood high temperatures and pressures to remain stored in the rocks through all the remaining eras.

Conclusion

Petroleum as such has not been positively demonstrated to have been generated in modern seas or lakes, and the conditions and time of transformation of organic source materials to mineral oil are not yet definitely known. A more careful examination, both chemical and bacteriological, of the oily and wax-like materials occurring in organisms as well as in recent and near-recent sediments containing plant and animal remains, one or both, should be undertaken. A comparison of the properties of the oils and waxlike substances from different depths in modern deposits rich in source materials should be particularly helpful in this respect. The Piggot gun or other similar sampling device should be well adapted to an investigation of this character.

The observations of J. Claude Jones regarding the increase in ether-soluble material with depth in Quaternary lake sediments of Nevada, indicate that an opportunity is presented in that area for further investigations of this subject. The exact nature and hydrocarbon content of the ether-soluble material and variations in its constitution with depth should be determined. Is it not possible that the transformation of organic material to petroleum and natural gas is a progressive process, which may begin during or soon after the death of the source organisms but not be completed until substantial burial has occurred? The oily and waxlike materials, not closely allied to crude oil, in recent sediments may pass downward into petroleum at comparatively shallow depths. Further study of promising Quaternary source sediments may reveal transitional stages between organic material and petroleum. The possibility that some asphalts, such as those along the east coast of Florida described by J. D. Haseman[9] may represent primary deposits and as such may constitute a source of petroleum should receive more attention.

A review of the data justifies the deduction that in respect to the age of the reservoirs both comparatively early and definitely late accumulation of petroleum and natural gas have taken place. It does not necessarily follow that these substances are generated in the mother rocks continuously or as successive "crops." It is possible that they may be stored for considerable periods after generation, either in a disseminated condition or as pools, which may undergo renewed migration as a result of changes in geologic structure.

In several areas now productive, the deeper-lying formations did not assume conspicuous structural relief until one or more geological periods after their deposition. In their earlier history, therefore, they were not appreciably tilted or subjected to extensive circulation of underground water, and conditions may have favored the retention of the oil and gas in a diffused form for long intervals of time until the static conditions were brought to an end by tectonic disturbances and artesian circulation became more vigorous. In some instances

there may have been renewed migration of oil and gas in pools previously formed as a result of changes in direction or amount of dip, faulting, increase in the vigor of artesian circulation, or other causes.

The terms "deferred" or "delayed" accumulation might be applied advantageously in situations of this kind. Deferred accumulation does not necessarily favor the geologic-distillation theory of oil and gas over the contemporaneous theory since the concentration of the hydrocarbons into pools sometimes occurred long after the maximum deformation in the history of the areas.

In reference to oil and gas that originated comparatively early in the history of the source rocks, three intergradational stages of their migration, in the simplest case, are probable: (1) Movement upward through softer, more porous muds and to some extent outward along porous zones towards the margin of the basin as a result of compaction induced by loading (in the later stages of geosynclinal development, appreciable focal inclinations, developed in the older strata by the normal process of deepening or by unequal settling over buried hills, may influence the movement; (2) Additional elimination of water and hydrocarbons as a result of later compaction accompanying deformation; (3) Migration induced by differences in specific gravity and the circulation of underground water.

If more than one period of tectonic disturbance is involved it is obvious that the train of events will be much more complicated. The direction of movement of fluids and gases might even be reversed and previous accumulations might be released and reaccumulated at more favorable points.

In discontinuous sands, reflected buried hills and ridges, and a few other types of traps, commercial accumulations might form during the first stage.

The question of the age and source of the oil in certain areas of multiple producing sands and in buried hills of Ordovician and younger rocks has such an important bearing on the problem at issue that additional studies of these occurrences should be undertaken. A comparison of the chemical constitution of Ordovician sandstone oils of such buried hills with those in the Misener sand of the Chattanooga formation and certain sands in the lower portion of the Cherokee formation in the same or nearby fields should yield interesting results. A similar comparison of oils from Ordovician reservoirs immediately below Chattanooga or Cherokee shales with those in identical horizons separated from the Chattanooga and Cherokee formations by several hundred feet of sediments in unfaulted areas might also be helpful. Certain chemical studies of Oklahoma and Kansas crude oils with the object of solving such problems are now being carried on by chemists of the United States Bureau of Mines under the sponsorship of the American Association of Petroleum Geologists.

It is possible that a microscopic examination of the refractory residues of oils will assist materially in determining their source.

J. McConnell Sanders[10] demonstrated the existence of vestiges of extremely small micro-organisms in crude oils, chiefly from the Mexican and Roumanian fields. Using magnifications ranging from 20 to 1463 times, he was able to isolate and identify diatoms, algal remains, lignitic fragments, spore exines, sponge spicules, insect scales and wings, barbules of feathers, and many other remains. He points out the possibilities of using these microfossils in oils for correlation and for determining their source. He mentions that in one instance a core sample of strata adjacent to the oil sands showed the same types of fossils as those in the oil.

It is not anticipated that the Paleozoic crude oils will show as large or as varied an assemblage as those studied by Sanders but it is believed that geologists have a new tool here, which may prove invaluable in determining the source of individual oil accumulations, due allowance being made for contamination by minute organisms contained within the oil reservoirs. In certain instances the source materials and the time and depth of oil generation may also be indicated.

9 Haseman, J. D. *"Humic Acid Origin of Asphalt"* Am. Assoc. Pet. Geologists Bull. Vol. 5, No. 1 pp. 75-79, Jan.-Feb. 1921; *Origin and Environment of Source Sediments of Petroleum Deposits* Am. Assoc. Pet. Geologists Bull. Vol. 14, No. 11, pp. 1465-68, Nov. 1930.

10 Sanders, McConnell J., *The Microscopical Examination of Crude Petroleum*: Inst. Petroleum Technologists Jour., Vol. 23, No. 167, pp. 525-573, September 1937.

Patent Roundup

Patents issued by the United States Patent Office, Washington, D. C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 25 cents per copy and can be had by addressing the Commissioner of Patents, Washington 25, D. C.

Chemical Treatment of Oil Sands

The patent for this method (No. 2,419,755) is owned by Frederick W. Albaugh, Inglewood, Calif., who assigned it to Union Oil Company of California, Los Angeles.

For treating water- wet oil sands to increase their effective permeability to oil, the sands are contacted with hydrocarbon oil solution of an organic heterocylic polycyclic amine of the class consisting of quinoline and its homologs, which does not substantially affeet the water-oil interfacial tension.

Pipe Joint

Frederick Robert Kelly, Shipston-on-Stour, England, has assigned this patent (No. 2,420,139) to Iraq Petroleum Company, London.

Chief aspect of the patent is a coupling which is adapted to being welded into a pipe line. It comprises a sleeve and an inner length of pipe into which the sleeve is threaded in a fluid-tight manner. A welded joint connects the sleeve and length of pipe, the sleeve being recessed internally for a portion of its length so that the reduced portion so formed may be parted by a suitable cutting tool, after which the adjacent pipe length may be turned without breaking the threaded connection and the parting in the sleeve subsequently made good by welding.

Pivot Mounted Safety Hook

Noel L. Dahlander, New Milford, Pa., has assigned one-half of this patent (No. 2,418,111) to Robert J. Earl, Deerfield Beach, Fla.

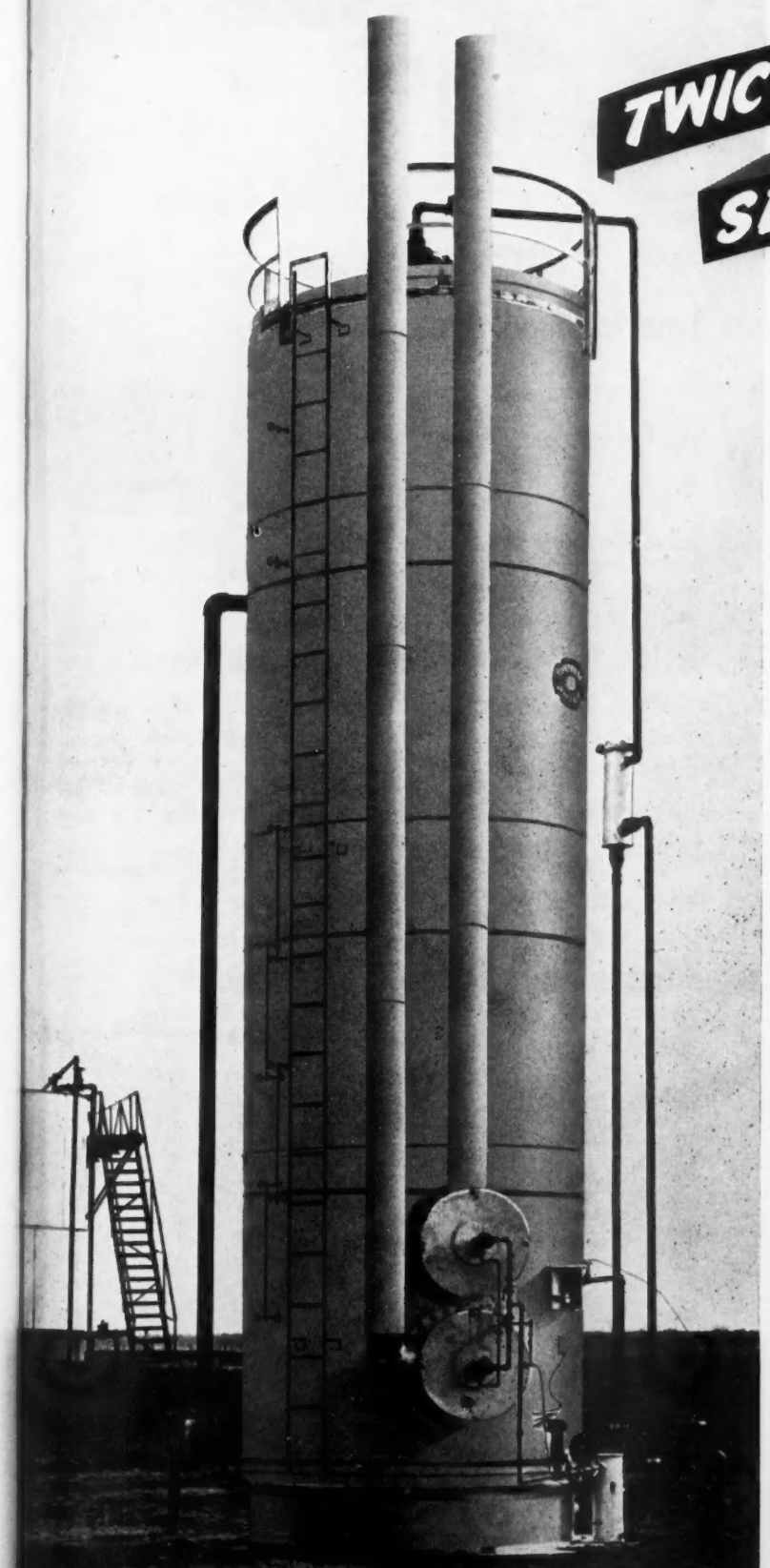
A clevis has parallel arms which support a pivot pin. There is a cross-arm at one end of the clevis and a cross-piece removed from the pin and extending from one parallel arm to the other. A claw member has an elongated slot to receive the pin between the parallel arms, and also has an extension to cooperatively engage with the cross-piece and a finger to engage with the cross-arm when the claw is in a closed position and the pin engages one end of the slot.

Diamond Drill

This drilling tool (No. 2,419,901) has been patented by William G. Lake, Toronto, Canada, and by him assigned to J. K. Smith & Sons of Canada, Ltd., also in Toronto.

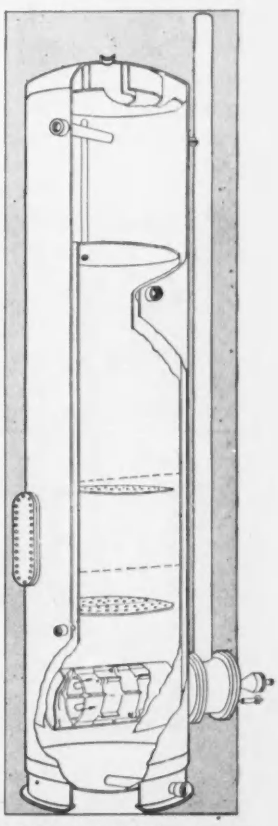
It combines a tubular coupling having an externally threaded shank with an annular ring having a diamond studded outer face detachably fitted on the shank, and a tubular bit internally threaded at one end for attachment to the shank in a snugly fitting relationship with the end of the annular ring, while the bit secures the ring in fixed position on the shank.

PARKERSBURG *Self-Insulating* EMULSION TREATERS



TWICE AS MUCH OIL SETTLING SPACE...

WHEN your salt water pits show the slightest sign of oil stain, you are losing oil that *superior-design* PARKERSBURG TREATERS will put in your storage tanks! The larger settling space in Parkersburg Treaters (twice as much settling space as some other prominent treaters) makes Parkersburg's new leader in the treater field a *famous new favorite* for efficiency and economy. Yes, Parkersburg Treaters discharge oil-free salt water . . . *eliminate oil waste!* That's one reason why more and more operators say: PARKERSBURG IS THE BEST BUY IN THE TREATER FIELD. Talk to your Parkersburg Representative!



✔Check these PARKERSBURG features:

- **Self-Insulating . . . provides greater efficiency and economy in the use of fuel. Unaffected by outside temperature changes.**
- **Preheats emulsions . . . assists in breaking down emulsions, helps free gas in solution before entering final treating chamber. Eliminates expensive preheating equipment.**
- **Even Heat distribution . . . combination radiation and convection heating distributes heat throughout length of heating tube.**
- **Heating element 100% proofed against hot spots and scale deposits.**
- **Removable baffles and wide range of adjustment of hot salt water bath and oil level.**
- **Mist extractor that scrubs gas and returns condensate to mixing compartment.**
- **Acts as separator, settling tank, heater and treater.**

THE PARKERSBURG RIG & REEL CO.

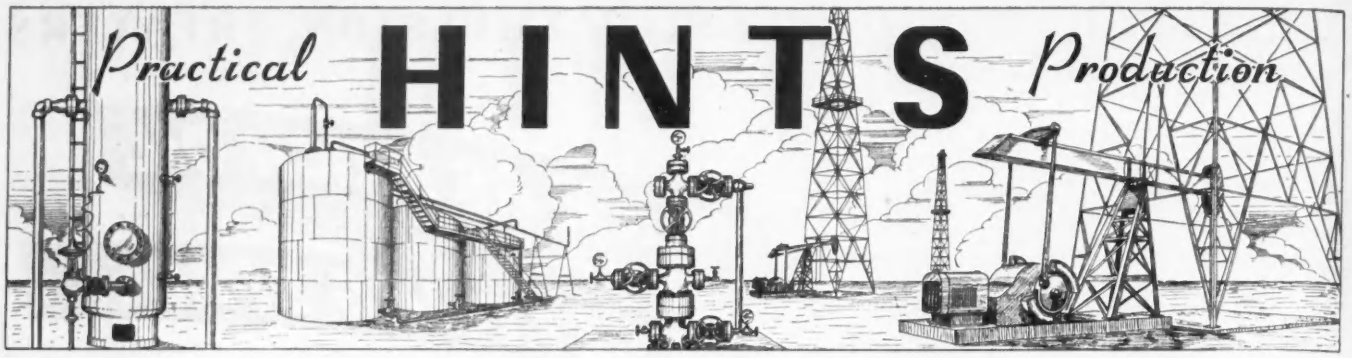
PARKERSBURG & OCS PRODUCTS

GENERAL OFFICES, PARKERSBURG, W. VA.
Plants at Parkersburg, W. Va., Coffeyville, Kan., Houston, Texas
District Offices:
Dallas · Houston · Los Angeles · Tulsa · New York

OCS

THE PARKERSBURG RIG & REEL CO. 50th ANNIVERSARY 1897-1947 PARKERSBURG, W. VA.

PARKERSBURG



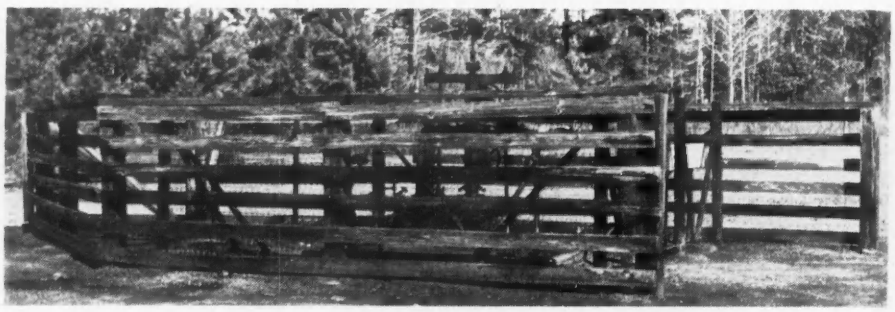
$10 is paid for each illustrated acceptable contribution. Mail to The Editor, *WORLD OIL*, P. O. Box 2608, Houston 1, Texas

How To— Prevent Damage to Christmas Tree in Flood Areas

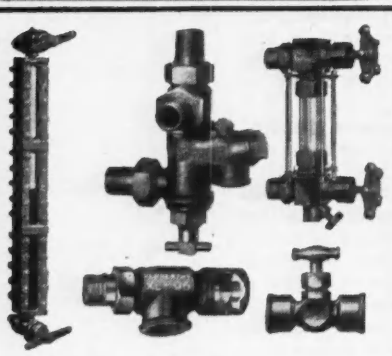
Where a well location falls within the area swept by a stream in time of flood, some protection is required to prevent damage to the Christmas tree by floating logs and other heavy debris.

LEASE PROTECTION

One operator protects his wells by building a heavy timber enclosure on all but the downstream side of the site. The upstream end is shaped like the prow of a ship with the sides continuing back to a point where eddy currents cannot bring in trash to interfere with well operation. The enclosure is supported on 8 x 8-inch posts buried well into the earth, and with 2 x 6-inch horizontal members spaced four inches apart. These horizontal timbers deflect floating trash and offer little encouragement to its lodging in the openings. Within the enclosure is a heavy wire fence, of two-inch diamond mesh, which stops all the sticks which manage to work between the horizontal timbers.



PENBERTHY
QUALITY PRODUCTS

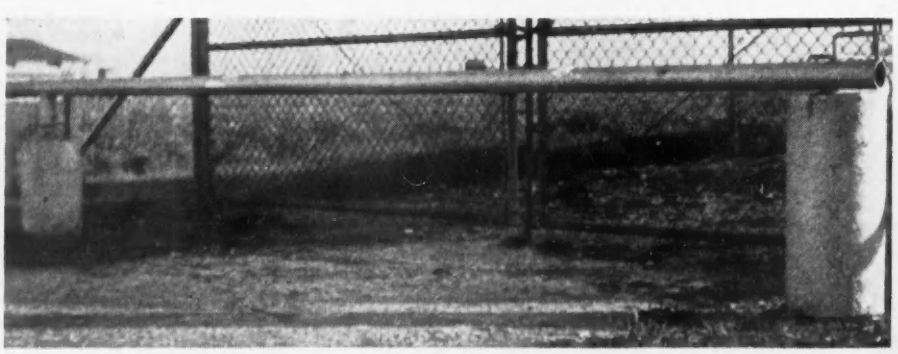


Penberthy liquid level gages of various types—injectors—ejectors—all so widely used throughout the oil industry because they have always been dependable under the most severe service conditions.

All are of rugged construction and made by an organization with 57 years experience in the manufacture of quality products.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

How To— Protect Lease Gates From Damage by Vehicles



To prevent trucks and passenger cars from bumping or bending the gate leading into one lease, the operator constructed a strong protective gate which is easy to operate.

LEASE PROTECTION

By setting pieces of 12-inch pipe in concrete, strong posts were provided. To the top of one of these posts a plate was welded carrying a notched piece to provide a support for the swinging end of the gate. The inside of the notched piece is rounded to fit the pipe so that it is impossible for the gate to be pushed inward.

The other post, shown at the left, is surmounted by a plate carrying a pin over which a 2½-inch nipple fits tightly, forming a bearing upon which the gate can swing. The far end of the gate carries a weight basket into which sufficient cement was placed to counterbalance the weight of the swinging member. The gate can be swung open and shut by merely raising the bar from its slot and swung shut as easily.

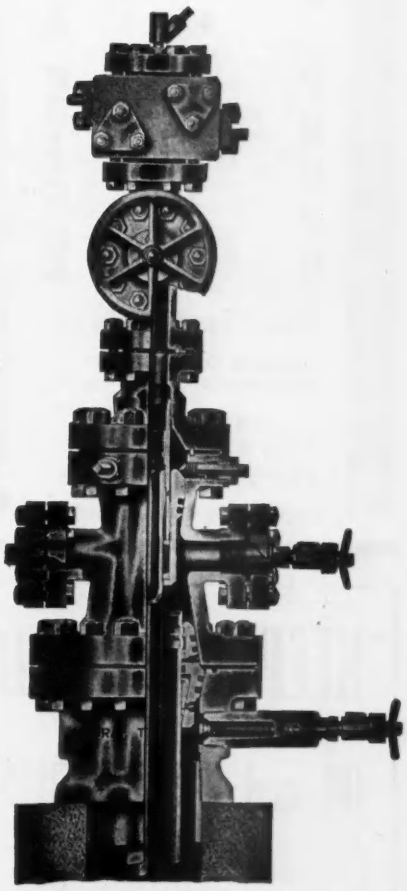
PLANS AND SPECIFICATIONS

Portray which parts will be most efficient

The practice of planning and then purchasing materials for the execution of the plan is a logical, simple method of approaching any problem. This results in conclusions which will operate efficiently. Not so when one limits his ability to plan to parts purchased previously.

The efficiency of planning and purchasing parts in the proper sequence is greatly increased when such planning can be performed in the light of the tremendous library or clearing house of thought accumulated by our company. This has been obtained in cooperation with operating personnel in reducing to plans and specifications the answers to problems in all parts of the world as presented to us by these operating companies.

Gray Systems of Well Control are completely planned and coordinated methods of operation. These systems are on the job around the world, shouldering the problems of men who have to work in well control. Knowledge gained from problems solved with men who actually drill oil wells is available to you when you use Gray Systems of Well Control.



Complete Well Head Assembly Equipped with Composite Manifold, Valve Removal, Installation and Renewal.

GRAY TOOL COMPANY
HOUSTON

Export Representative: GUY E. DANIELS, 30 Rockefeller Plaza, New York City
Rocky Mountain Representative: CARL MOULDEN, P. O. Box 1890, Casper, Wyoming

INCREASE PRODUCTION
Clean Out With
MILLER

SAND PUMPS

O.D. SIZES
2½"
3 "
3½"
4¼"
5 "
5½"
7 "

LENGTHS
20'
25'
30'

REGULAR BAILERS

Miller Sand Pump Co.
General Office Box 4516
OKLAHOMA CITY 9, OKLA.
EXPORT OFFICE
30 Rockefeller Plaza
NEW YORK CITY 20, N. Y.
See Composite Catalog Page 2426

KEEP INFORMED
OF YOUR
OIL and GAS RESERVES

Yearly periodic engineering surveys* of your oil and gas reserves will provide you with

(1) The **value** of your properties.

(2) Advisability of **increasing oil reserves** by secondary recovery.

(3) Comprehensive data to determine past progress and **future policies.**

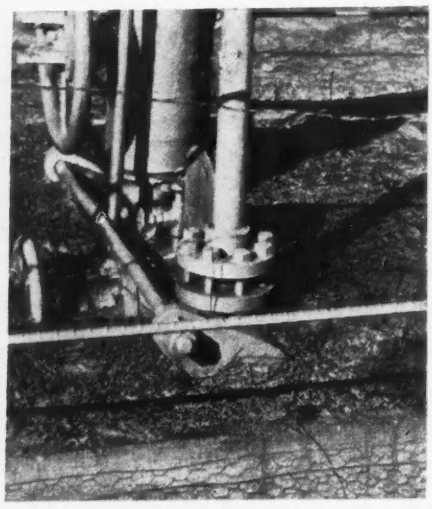
(4) Recoverable reserves for calculation of **unitization participation** when desired.

* Write for our bulletin explaining the Petroleum Engineering appraisal method or have one of our engineers call on you and acquaint you with our nation-wide oil appraisal service.

KEPLINGER and WANENMACHER
PETROLEUM ENGINEERS
Nationwide Oil Appraisal Service
Kennedy Bldg. Tulsa, Okla.
Phones 2-0015, 2-3054

How To—

Guard Well-head



Where producing properties are located close to a highway or occupied area, there is always the possibility that equipment will be molested either maliciously or by persons who have no idea of the damage they may cause.

LEASE PROTECTION

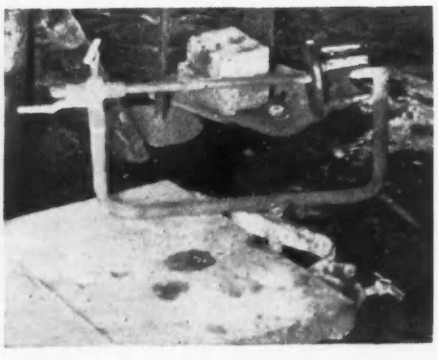
One company buries a portion of the Christmas tree in loose gravel inside a shallow wall cast around the well head. This fill is high enough to take in more than half of the valve on the cross which permits the casing annulus to be flowed.

The valve wheel thus protected by the gravel fill does not tempt the unauthorized person to attempt to wheel it; yet the casing may be flowed simply by raking away the gravel when need is present for such operation.

How To—

Reface Worn Pump Valves

When laying a new face on worn pump valves prior to machining, the accuracy of the job is improved by the use of a simple tool having centering bars which work on the same principle as a machinist's lathe.



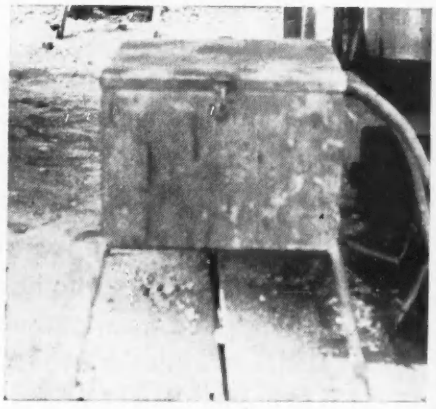
VALVE REPAIRING

Body of the tool is made from bar steel and formed in the shape of a hack-saw frame. One end is bent sharply, or a short piece welded at the end of this body at a 90-degree angle. A hardened point is made which will fit into the centering holes of a valve between the guide vanes.

The opposite end is fitted with a long threaded nut which holds a horizontal bar, also having a hardened point to fit into the centering hole in the head of the valve. A wing nut and pin set into the long nut helps to hold the adjustment while working the valve. A pin is welded to the base of the frame so that either a holding bracket may be used or the tool clamped in a vise.

How To—

Lengthen Battery Life



Engine-driven pumping units located in hot climates impose a hardship on batteries unless ample protection is afforded this source of starting current. Damage due to the elements is serious if such batteries are left uncovered and exposed to sun and rain.

EQUIPMENT CARE

One operator protects batteries by enclosing these units in metal boxes as illustrated. The boxes are constructed of ⅛-inch sheet metal welded to fit the size of battery in use. The hinged cover is lipped around the edges to prevent the entrance of water, and is provided with a hasp to accept a lock. The latter prevents unauthorized use of the battery. Two holes cut in one side permit the cable leads to pass into the box. Short lengths of sucker rod material are used for legs.

CP TYPE ES
THREE CONE ROCK BIT

for FAST drilling in soft formations

TYPE ES THREE CONE ROCK BIT

In the softer formations – such as compact sand, shale, chalk, red bed, salt, etc., commonly found in oil fields – the CP Type ES Three Cone Rock Bit is breaking drilling records for feet per hour.

Designed for maximum resistance to hard, abrasive wear, these bits give the long service demanded by modern drilling methods. Cones and bearing journals are of high alloy forged steel, accurately machined and carefully heat-treated, with a special hard facing on the teeth of the cones.

CP bits are designed in the necessary types and sizes to meet the specific drilling requirements in different oil fields. Prompt service is assured in the Mid-Continent and Rocky Mountain fields.

CHICAGO PNEUMATIC TOOL COMPANY

MANUFACTURED AT FRANKLIN, PA.

GENERAL & EXPORT OFFICES: 6 EAST 44th STREET, NEW YORK 17, N. Y.

Oil Tool Sales Office: One N. W. 16th Street, Oklahoma City, Oklahoma

Runs to Stills Climb to Record High; Gasoline Stocks at New Low for Year

The industry's statistical position for the week ended July 12 reflected seasonal trends generally, although the current high levels of operations continued. Heavy demand for refined products is indicated by API figures showing a new all-time high for refinery runs to stills, and gasoline stocks at the lowest point this year.

With the single exception of gasolines, stocks were continuing the buildup apparent through most of this year, with a favorable trend in accumulation of heating oils for the winter season.

Crude production in the U. S. decreased for the second week in succession, slumping another 20,000 barrels to 5,045,000 barrels a day, 70,000 barrels daily less than the all-time high established during the week ended June 21, but still representing a net gain of 110,000 barrels daily over a year ago.

Crude runs to stills reached the all-time high at 5,229,000 barrels daily during the week with refineries operating at 93.2 percent of nominal capacity. This represents an increase of 120,000 barrels daily over figures for the preceding week, and 363,000 barrels daily more than a year ago.

Despite an increase of 438,000 barrels in production of gasoline, including gasoline blended at refineries, to 16,197,000 barrels for the week, stocks of finished and unfinished gasoline continued the decline started in February to reach a new yearly low at 88,791,000 barrels. Gasoline production for the week was 1,255,000 barrels higher than the corresponding week a year ago, while gasoline stocks have decreased 2,016,000 barrels during the same period, and are now approaching the low for 1945 when stocks stood at 85,324,000 barrels late in September.

On July 6, the Bureau of Mines reported crude in storage at 222,377,000 barrels, reflecting a draft of 2,411,000 barrels since the preceding week, although additions since the corresponding period a year ago have amounted to 11,433,000 barrels, or 5.1 percent.

Gas-oil and distillate production maintained the high level apparent throughout the year with 5,909,000 barrels, or 250,000 barrels more than last week were produced. This is an 8.4 percent increase, or 457,000 barrels more than was produced at this time a year ago. This allowed addition to storage of 2,261,000 barrels during the week, bringing the total to 45,261,000 barrels as of July 12.

Residual fuel production for the week showed an increase of 194,000 barrels over the previous week to total 8,679,000 barrels, or 433,000 barrels more than was produced during the corresponding week of 1946. At the same time stocks of these fuels climbed to 50,529,000 barrels, reflecting a boost of 1,378,000 barrels over last week, and 2,277,000 barrels more than a year ago.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
High:												
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1945	4,944	7-21	5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	4,961	6-15	4,968	12-28	229,430	3- 2	105,233	2-16	[1]67,286	11- 9	61,086	11- 2
1947	[1]5,115	6-21	[1]5,229	7-12	239,370	5-31	107,576	3-29	58,034	1- 4	53,285	1- 4
Lows:												
1945	3,621	10- 6	3,409	10- 6	[2]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,408	3- 9	4,498	1-12	218,198	1- 5	85,324	9-28	25,131	3- 9	37,289	4- 6
1947	4,531	4-11	4,667	4-12	220,313	2- 8	88,791	7-12	31,470	4-19	42,668	4-26

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1946									
January 5	4,548	4,651	218,193	14,488	98,494	5,923	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,477
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 25	4,672	4,820	221,655	14,624	99,801	5,630	50,357	8,224	48,558
February 22	4,786	4,860	224,580	14,668	103,904	5,929	40,739	8,542	44,919
March 29	4,865	4,843	227,529	14,396	107,576	5,969	32,737	8,668	43,364
April 26	4,930	4,725	235,383	14,213	103,860	5,435	32,286	8,186	42,668
May 31	5,024	5,009	239,370	14,709	95,876	5,732	36,032	8,910	45,224
June 28	5,109	5,093	236,221	16,070	91,806	5,906	41,721	8,298	48,490
July 5	5,065	5,109	233,810	15,759	89,674	5,659	43,000	8,485	49,151
July 12, 1947	5,045	[1]5,229	.....	16,197	88,791	5,909	45,261	8,679	50,529
July 13, 1946	4,934	4,866	[3]222,377	14,942	90,807	5,452	42,652	8,246	48,252
Change:									
In Week	—20	+120	—2,411	+438	—883	+250	+2,261	+194	+1,378
In Year	+111	+363	+11,433	+1,255	—2,016	+457	+2,609	+433	+2,277
In Year	+2.2%	+7.5%	+5.1%	+8.4%	—2.2%	+8.4%	+6.1%	+5.3%	+4.7%

[1] All time peak. [2] Lowest since December, 1921. [3] Stocks, July 6, 1946.

Premier's Crude Price Hike Not Followed by Other Firms

The crude price increase instituted by Premier Oil Refining Company in East Texas July 10 had not been matched by any other purchasers late last week. Premier explained the increase was to meet competition of purchasers paying premiums above the posted price, but it has not elicited any action from other purchasers reflected in posted prices.

Posting of increased gasoline prices of ½ cent by Socony-Vacuum Oil Company for the New York and New England areas has been met by two additional suppliers at Boston. Socony at the same time upped prices on kerosine, diesel and heating oils in amounts ranging from 0.1 to 0.8 cent per gallon. Averages amounted to 0.4 cent per gallon for kerosine and 0.5 cent for all other products, all effective July 15. Two Boston suppliers have met the postings for kerosine and No. 2 fuel also.

One supplier in the New York harbor area had met Socony's kerosine and No. 2 fuel oil prices but other light fuels were left unchanged. Suppliers generally were studying schedules and making field checks before announcing decisions.

Gulf Coast suppliers stated they could get 10 cents for regular-grade gasoline from buyers in most parts of the Mid-Continent, but were not offering spot material at present.

One Western Pennsylvania refiner has increased prices from 1 cent to 1.25 cents for kerosine and light fuels, indicating these advances were a reflection of prices paid for material to supplement his own production.

• Oklahoma

Arbuckle Lime Gas Production Opened in Stephens County

Arbuckle gas production opened in Stephens County; oiler may revive Payne County area; Cleveland County wildcat shows distillate on test; new zone likely at Northeast Lindsay field; Harper County Wildcat continues testing.

Stephens County: Discovery of Arbuckle lime gas production has been credited to George Pace et al's Watkin's 19, NW NE SE 21-2s-7w, Empire-Comanche pool. Arbuckle was topped at 3184 feet, and on a drill-stem test at 3184-202 feet, tool open 5 minutes, the well showed 50 million cubic feet of gas. Crew was ordered to cement 5½-inch casing to top of the pay, where testing will continue.

Payne County: A producer which is reviving interest in an old sector is L. G. Wheeler et al's Sorie 1, NW NW NW 19-19n-4e, wildcat, which flowed 10 barrels of oil an hour by heads from the Second Wilcox sand, 4270-81 feet. Flow came through 7-inch casing, with about 1 million cubic feet of gas daily. Shows and stainings were found in more than a dozen horizons.

Cleveland County: The Faultline Oil Company has indications of a distillate producer two miles east of the southern tip of the old Moore field. School Land 1, CNE NW 36-10n-2w, topped the Bartlesville sand at 6443 feet, and had stain and odor to 6480 feet, where a drill-stem test was made. With packer set at 6445 feet, the well showed an estimated 2 million cubic feet of gas, and 330 feet of gas and distillate-cut mud. Bottomhole pressure was 2850 pounds. Drilling will continue before the crew attempts to bring the well into distillate production.

McClain County: The Carter Oil Company has indicated production in the Pennsylvanian sand zone for the Northeast Lindsay field, Harrison 1, CSW NE 25-5n-4w, running tests in the Deese sand. The field produces from both the Hunton lime and the deep Bromide sand zones. The Harrison, a north offset to the Bromide discovery, ran a drill-stem test at 8060-90 feet, and with tool open 70 minutes, showed gas and flowed oil at the end of an hour. Flow was estimated at 15 barrels per hour, with 1 million cubic feet of gas per day.

Harper County: Testing continued at J. M. Huber Corporation et al's Hieronymus 1, CNW SE 3-26n-24w, near Laverne, which shows indications of opening the county's first oil field. Total depth is 7008 feet in the Mississippi lime, topped at 6764 feet. Seven-inch casing is being set near the bottom and 3 zones, from 5237-75, 5439-45, and 6175-220 feet, will be tested.

All showed favorably on electrical log. If the well fails to come in commercially it may be deepened.

Processing Unit Planned

Sid Richardson Refining Company, owner of a 20,000-barrel daily capacity crude refinery at Texas City, Texas, is preparing specifications for the erection of a lubricating oil processing unit that will have a capacity of 5000 barrels daily. Lube stock material will be obtained from the Ellenburger oil production held by Sid W. Richardson, Inc., and Richardson & Bass, Inc., in the Keystone field, Winkler County sector of West Texas. Negotiations are pending for the delivery of the crude by direct pipe line.

• Kansas

Oil Pool Apparently Opened In Paradise Creek Vicinity

Oil pool apparently opened in Rooks County; Continental proves pool near Barry area; Atlantic's wildcat looks favorable for production in Arbuckle lime; Graham County wildcat continues testing.

Rooks County: An oil pool apparently has been proven a mile southeast of the Paradise Creek pool. Lowell Drilling Company et al's Hays 1, NE NE SE 28-9s-18w, averaged 30 barrels of 31-gravity oil per hour from the Lansing lime at 3405-13 feet. The formation was topped at 3322 feet, and total depth is 3601 feet in the Arbuckle lime. Hole filled with water in the Arbuckle, after which operators plugged back to the Lansing.

Continental Oil Company has proven oil production 2 miles east of the Barry pool with the Gilbert 1, NE NE SE 6-9s-18w. Arbuckle, topped at 3487 feet, yielded free oil, and testing is under way. With tools 5 feet in the formation, oil rose in the hole at the rate of 150 feet an hour.

Testing continues at The Atlantic Refining Company's Ruzicka 1, NE NE SW 17-9s-18w, 1½ miles northwest of the Paradise Creek pool. Saturation was logged in the Arbuckle lime at 3555 feet, where testing is now under way.

Graham County: The Wilcox Oil Company continues to test at Rush 1, NW NW NE 9-6s-22w, prospective pool opener 6 miles southwest of the Ray pool and 12 miles northeast of Hill City. Several oil shows were logged in the Lansing lime, topped at 3873 feet. Arbuckle lime was found dry at 3873 feet. Following initial treatment at 3655-65 feet, the well flowed 17 barrels of oil an hour.

Mexico Restricts Imports Of Gasoline from U. S.

Restrictions on importations of gasoline from the United States to Mexican border areas have been revealed in a government decree signed by President Miguel Aleman.

The decree, effective 10 days from July 15, prohibits gasoline imports "which would have prejudicial effect on the federal revenue and the general economy of the country."

Wells Completed in the United States in Week Ended July 12, 1947

Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*Input	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Alabama	...	...	...	...	...	...	...	...	...	...	1	1	1	3	...
Arkansas	...	...	...	...	3	3	...	...	...	...	1	1	4	5	1
California	23	...	1	...	1	25	...	...	...	...	5	5	30	26	29
Colorado	6	...	...	...	...	6	...	...	...	...	...	...	6	2	3
Florida	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Illinois	19	....	1	...	10	30	...	5	...	...	7	12	42	50	69
Indiana	6	....	...	...	5	11	...	...	...	...	1	1	12	25	10
Kansas	33	....	7	...	6	46	1	...	...	...	8	8	55	47	35
Kentucky	4	....	2	...	1	7	...	...	...	...	1	1	8	14	15
Louisiana	21	2	3	...	6	32	...	2	...	...	12	14	46	40	27
N. Louisiana	13	...	3	...	5	21	...	1	...	...	9	10	31	13	11
S. Louisiana	8	2	...	...	1	11	...	1	...	...	3	4	15	27	16
Michigan	8	...	...	...	1	9	...	...	...	...	1	1	10	23	12
Mississippi	9	1	...	...	1	11	1	...	...	...	4	4	16	9	5
Montana	3	...	...	...	...	3	...	...	...	...	...	...	3	2	5
New Mexico	...	...	1	...	...	1	...	...	...	...	3	3	4	11	7
New York	14	...	...	16	...	30	...	...	...	...	...	...	30	29	25
Ohio	6	...	11	...	7	24	...	...	...	...	1	1	25	31	19
Oklahoma	51	...	7	...	21	79	...	3	...	...	16	19	98	77	50
Pennsylvania	20	...	14	22	3	59	...	...	...	...	...	...	59	62	47
Texas	114	2	7	...	37	160	6	10	...	...	40	50	216	236	142
DISTRICTS:															
1—S. Central	3	...	...	...	...	3	...	...	...	...	2	2	5	6	1
2—Middle Gulf	9	...	1	...	1	11	...	1	...	...	1	2	13	11	[1]
3—Upper Gulf	15	1	...	...	7	23	1	...	...	...	3	3	27	13	11
4—L. Gulf-S.W.	8	1	...	...	3	12	1	2	...	...	10	12	25	40	23
5—E. Central	2	...	...	...	2	4	...	1	...	...	2	3	7	4	[2]
6—Northeast	5	...	2	...	...	7	...	...	...	...	2	2	9	10	9
7-B—N. Central	15	...	...	...	4	19	2	1	...	...	5	6	27	15	[3]
7-C—W. Central	...	...	...	...	...	...	...	1	...	...	3	4	4	5	[4]
8—West	27	...	...	...	1	28	1	1	...	...	3	4	33	45	37
9—North	28	...	...	...	19	47	...	3	...	...	8	11	58	72	57
10—Panhandle	2	...	4	...	...	6	1	...	...	...	1	1	8	15	4
West Virginia	3	...	13	...	4	20	...	...	...	...	...	...	20	21	4
Wyoming	1	...	...	...	...	1	...	...	...	...	1	1	2	5	6
Total U.S.	341	5	67	38	106	557	8	20	...	...	102	122	687	718	513

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S.W. [2] East Central included with Northeast. [3] North Central included with North. [4] West Central included with West.

• New Mexico

Cap Rock Given Nine Tests; End of Proration Expected

Nine new tests assigned Cap Rock field in anticipation of early lifting of pipe line proration; Ellenburger production trend north of the Brunson field may be curbed by low well.

Development of the Cap Rock field centering upon the Chaves-Lea County line promises to be revived on a larger scale than ever due to the scheduled completion of Stanolind Oil & Gas Company's 8-inch trunk line extension from its West Texas system about September 1. This area has been subjected to pipe line proration for more than a year due to its isolation from a railhead and dependence upon a small refinery for a market outlet. The Cooperative Producing Association, which paid $980,000 to Geo. P. Livermore and associates last August for 28 completed wells, is starting its initial drilling program with 7 tests on proved locations. A. K. Polis and associates are new entrants, making 8 locations for the week.

Lea County: Amerada Petroleum Corporation's Hare 6, NW SW 33-21s-37e, and west offset to Ellenburger production on the north end of the Brunson field, was drilling effective oil pay at 8160 feet in Ellenburger, topped at 8110 feet, with elevation 3462 feet. This marker correlates 440 feet low to the east offset that logged 174 feet of Dolomite lime and sand pay. While Hare 6 has logged adequate pay to make a commercial producer, its low structural position will discourage drilling north and west.

Amerada's Walden 4, C NW SW 15-22s-37e, west offset to the most southerly Ellenburger producer in the Brunson area landed pipe at 7912 feet, or 1 foot off bottom, to complete through perforations from 101 feet of Ellenburger, which was followed by granite wash from 7898 to granite at 7906 feet. More development will occur in this sector. Humble Oil & Refining Company's Greenwood 11, near the east edge of production, encountered Ellenburger at 7476 feet with the section cut short due to granite at 7495 feet. It is completing in the 6500-foot Yeso after developing a nominal amount of oil from Ellenburger perforations at 7476-92 feet. Amerada's Phillips 5, projected Ellenburger test for the apex of the Monument field's Permian producing structure, was drilling at 5550 feet.

Consumers Co-Op Wins Court Approval of Its Activities

The Consumers Cooperative Association of North Kansas City, Mo., is authorized under Kansas statutes to carry out its extensive industrial activities, and the association will not be dissolved as was requested in a suit brought by Kansas Attorney General Edward F. Arn. This was the ruling of the Kansas Supreme Court.

Justice William A. Smith delivered the unanimous decision, holding that the Cooperative Marketing Act, under which the Association is incorporated, does not limit it to the sale of agricultural products, but permits it to engage in any activity in connection with manufacturing selling or supplying to its members of machinery, equipment or supplies.

The association has the authority under the act to manufacture such supplies and equipment, including oil products, and to own and operate oil wells and pipe lines with which to carry out these activities, the court ruled.

With general offices in Kansas City, the Consumers Cooperative Association owns and operates oil wells, pipe lines, refineries, lumber mills, paint factories, printing plants and a number of other enterprises in nine Midwestern states, principally in Oklahoma, Kansas, and Missouri.

In a separate case, the Supreme Court ordered Secretary of State Frank J. Ryan to file an amendment to the association's articles of incorporation, allowing it to increase its capital stock from $2 million to $12 million.

The State Charter Board, in an action which gave rise to the attempted dissolution suit, had held that the stock increase should not be granted because, in its opinion, the association was exceeding its statutory privileges.

The opinion, which was written by Justice Hugo T. Wedell, held that the Secretary of State, a member of the Charter Board, does not have the power to determine the legal facts of matters foreign to a legally sufficient certificate of amendment.

CHEMICAL AND TECHNICAL DICTIONARY

Edited by

H. BENNETT

Technical Director, Glyco Products Co., Inc.
Author Commercial Waxes, The Chemical Formulary, Practical Emulsions, Chemical and Technical Dictionary, Etc.

The Most Complete Up-to-the-Minute Volume of its Kind Available

This basic work of technical reference, in dictionary form, gives the latest, most accurate data obtainable about processes, apparatus, machinery, terms, materials, finished products, practices, elements, composition, uses, properties, trade names, formulae, etc. . . . a veritable library of indispensable professional knowledge. Included are several useful tables.

Every possible effort has been made to obtain accurate and up-to-date information, to make each entry authoritative. All the data for a given compound, all definitions are given in compact paragraph form, each main entry being printed in bold face type, so that the desired term is easy to locate on the page.

The definitions are concise, but clear and to the point. Thousands of abbreviations add to the value of this book.

Durably and Attractively Bound • 1120 Pages • 6 x 9
$10.00

Send Orders to

THE GULF PUBLISHING COMPANY
P. O. Box 2608
HOUSTON, TEXAS

• West Texas

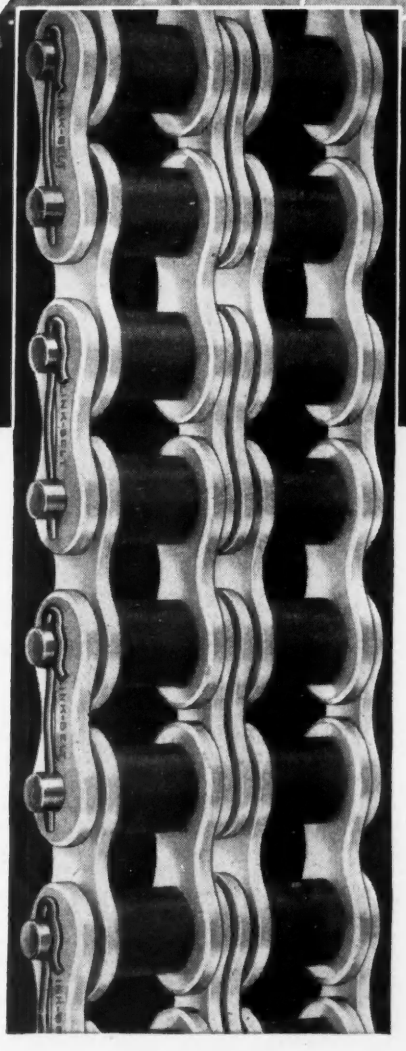
Ellenburger Production for Goldsmith Test Is Indicated

High structural position of Goldsmith field deep test to result in production from Ellenburger; Dollar Hide field outpost proceeding to Ellenburger after confirming 2 oil zones; oil extensions recorded by Hockley and Schleicher counties; Ellenburger is the objective of a large percentage of the new wildcats.

Ector County: Gulf Oil Corporation's Goldsmith 430-E, ⅝ mile northwest of Devonian-pay discovery for the Goldsmith field, was drilling Simpson series at 9068 feet with adequate structural relief to make a producer from the Ellenburger, which tested water in the initial deep try on the company's 19,840-acre lease. Goldsmith 430-E flowed oil from Devonian, topped 21 feet high, and also indicated commercial production in the Silurian, which proved 239 feet high. The Montoya was entered at 8540 feet, thereby maintaining the 239-foot structural relief. These pre-Permian beds register a sharp drop to the west as revealed by a recent Ellenburger failure.

Gulf and Kewanee Oil Company's University 1-A, ¾ mile southeast of the Ellenburger-pay discovery for the Jordan field, was drilling Simpson at 8850 feet, correlating about 250 feet low. While it is considered eliminated for production in the Ellenburger, which affords a comparatively thin pay in the discovery, showings in the Devonian and Silurian probably warrant setting pipe for completion try.

Shell Oil Company's Cochran 1-A, 1¼-mile north extension for the De-



IT'S LINK-BELT *Silverlink* ROLLER CHAIN

. . FAVORITE OF THE FIELD FOR FASTER SPEEDS

Long before high speed drilling was the accepted practice for deep and shallow holes alike, Link-Belt Silverlink Finished Steel Roller Chain was setting the pace for dependable chain performance in this tough service. That's why today, when rig manufacturers . . . and operators alike . . . talk in terms of fast speeds and tough drilling, they turn to Link-Belt Silverlink. Yes, Link-Belt Silverlink Roller Chain on this new high speed drawworks, for example, is the choice of both manufacturer and owner. The accurately finished Link-Belt Silverlink . . . the high standards of precision, great strength, yet light weight, flexibility, and ability to withstand shock . . . will keep this rig running smoothly for many wells to come. There are seventy-one years of continuous chain improvements behind Link-Belt Silverlink Roller Chain.

➢ E-Z-ASSEMBLY ➣

Link-Belt Engineers have developed a construction that makes assembly and disassembly of multiple width chains in the field much easier. The press fits between chain pins and center sidebars have been eliminated, but load distribution across the width of the chain has been maintained.

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 2, Los Angeles 33, Kansas City 6, Mo., New York 7, Toronto 8.

10,776

LINK-BELT

CHAINS AND SPROCKETS

A Type for Every OIL INDUSTRY SERVICE

vonian-pay sector of the TXL field, pumped 39 barrels initial after extensive conditioning of the hole and multiple acid treatments of the Devonian broken pay at 7960-8150 feet. The offset lease to the north was allowed to lapse rather than to drill for such small production.

Andrews County: The Pure Oil Company et al's Cowden 1, north outpost for the Dollar Hide field with production assured from the Devonian and Silurian, was drilling at 8840 feet, and will continue to the Ellenburger. The high structural position of this outpost reveals that production will continue some distance. Cowden 1 first attracted attention in indicating probably 41-gravity oil from the Wichita-Albany at 6700-80 feet.

Stanolind Oil & Gas Company's University 1-AC, C NE SW Sect. 6, Block 9, south outpost for the Fuhrman-Mascho field and a failure in the regular Permian zone, was drilling at 6520 feet in Clear Fork, topped at 6465 feet. The Glorietta was entered at 5625 feet, or 157 feet low to a 5539-foot junked hole 1½ miles east by south.

Lamb County: Sunray Oil Corporation's Gipson 1, wildcat projected to the 6500-foot level and 2¼ miles southeast of a 9162-foot failure, was drilling at 5835 feet in Clear Fork, topped at 5230 feet with elevation 3515 feet. Gipson 1 correlates 253 feet high on the San Andres, entered at 3200 feet, but its Clear Fork marker is about 100 feet low.

Seaboard Oil Company was starting Jackson 1, SWc Labor 15, League 680, State Capitol Lands, to explore the Ellenburger. It is in the southwest corner of Lamb County. and 1½ miles southwest of a 4374-foot junked San Andres test.

Hockley County: Western Drilling Company-Jas. Edmiston, Jr.'s Gregg-Texaco 1, 1½ miles north by west extension for the east portion of the Levelland field, established the water table in deepening to 4868 feet, and has plugged back to complete from open hole pay at 4798-4859 feet. This outpost entered the San Andres at 3800 feet, with elevation of 3567 feet, and preliminary test at 4833 feet indicated an average-yield pumper. The intermediate acreage will be drilled promptly. The structural position of this outpost points to further extensions.

Crockett County: Plymouth Oil Company's Owens 2-O-A, C NW NW H&OB 6, Block GG, north offset to the recent Crinoidal flush producer for the Owens area, flowed 192 barrels of oil natural on 4-hour test through 5/16-inch choke from perforations at 5672-77 feet. The company's Owens 1-O-A, east offset to the discovery was temporarily abandoned at 6270 feet after unsuccessful tests of the 5600-foot zone, while Cities Service Oil Company's Hobbs 1, west offset to the discovery and also structurally low, will reperforate higher after initial test at 5745-50 feet yielded sulfur water and trace of oil.

Crockett County leads the district in volume of Ellenburger prospecting although 3 failures were listed within the past month. Of the 5 active tests, Sinclair Prairie Oil Company and Atlantic Refining Company's University 1-66 and Humble Oil & Refining Company's Mitcham 1 are nearing interesting levels, having progressed to 7360 feet and 7640 feet, respectively. Byrd & Frost, Inc., et al's Mayberry 1, which is supported by numerous companies, was drilling lime at 3660 feet.

Schleicher County: Al P. Groebl et al's Koy 1, C NW SW GH&SA 34, Block L, mile northeast outpost for the Page field, which has 10 oil producers in the Strawn, swabbed 4 barrels of oil hourly after using 1000 gallons of acid through perforations at 5525-40 feet. Second acid treatment was underway.

General American Pays $3 Million for Properties

General American Oil Company of Texas, with headquarters at Dallas, paid $3 million cash to A. R. Dillard, Wichita Falls producer, for 2 groups of oil properties in Oklahoma and Texas.

The deal involves 5 leases, with 46 shallow wells producing 1600 barrels daily in the Soldier's Creek field, Cotton County, Okla., while $1 million of the consideration was paid for 2 Ellenburger wells and deep rights below 4200 feet on an 80-acre lease in the Keystone field, Winkler County, West Texas. The latter lease was acquired for development early in 1945 from J. J. Perkins and the Bashara interests, who retained 11/32 overriding royalty interest besides their royalty interest. Both deep wells have been on production since early in 1946. Pure Oil Company has been given first call on the Ellenburger production.

THE OIL MAN'S CALENDAR

JULY 26	Illinois Oil & Gas Association and Illinois Basin Chapter, API, Annual Mid-Summer Meeting, Robinson, Ill.
AUG. 11-13	Interstate Oil Compact Commission, Great Falls, Mont., Rainbow Hotel.
25-27	Annual Appalachian Gas Measurement Short Course, West Virginia University School of Mines, Morgantown.
SEPT. 10-11	Rocky Mountain Oil & Gas Association, Fall Meeting, Casper, Wyo.
17-19	National Petroleum Association Annual Meeting, Atlantic City, Traymore Hotel.
23-24	Fall Meeting, Petroleum Division, AIME, Los Angeles, Elks Club.
29-30	Annual Meeting Independent Petroleum Association of America, Oklahoma City.
28 to Oct. 2	Regional Meeting, AIME (includes 2-day Petroleum Division Session). Denver.
OCT. 6- 8	American Gas Association, Annual Meeting, Cleveland.
6- 8	ASME Petroleum Mechanical Engineering Conference, Houston
8-10	Fall Meeting, Petroleum Division, AIME, Tulsa, Mayo Hotel.
13-15	Annual Meeting, American Association of Oil Well Drilling Contractors, Long Beach, Calif.
16-17	Texas Mid-Continent Oil & Gas Association, Annual Meeting. San Antonio, Gunter Hotel.
NOV. 10-13	American Petroleum Institute Annual Meeting, Chicago, Stevens Hotel.
1948 MAY 15-22	International Petroleum Exposition, Tulsa.

Nomads Chapter monthly meetings: LOS ANGELES, second Wednesday, Jonathan Club HOUSTON, second Monday, Ye Olde College Inn, NEW YORK, first Monday, Louis Sherry's TULSA, third Wednesday, Hotel Tulsa. DALLAS, date not yet fixed.

• North Texas

Wildcat in Denton County Has Oil Show in Two Zones

Wildcat in sparsely explored sector of Denton County has oil show in 2 zones; deeper pay in prospect for Belcherville field; new oil zone in Handy field has natural flow.

Denton County: The Texas Company's Saunders 1, northeast corner of a 165.9-acre tract, John Ayers Survey, A-2, and 9 miles southeast of the Bolivar field, nearest production, was testing lime at 1990-2000 feet that carries nominal oil showings. This isolated wildcat failed to confirm with drill-stem tests oil showings in a sand at 1879-89 feet, and broken sand and shale to 1933 feet. However, these showings will induce the drilling of more tests in the area.

Gibson Oil Corporation et al's Forrester 1-B, J. B. Baroux Survey 45, offsetting production in the Bolivar field, pumped 20 barrels of oil initial from sand at 1648-60 feet, with the hole bottomed at 1669 feet.

Montague County: Bay Petroleum Corporation's Reeves-Texaco 1, P. Miller Survey, and on the northwest edge of the Belcherville 9-well field, missed the regular 5300-foot oil zone, and will attempt to complete from deeper pay. Oil-saturated conglomerate was logged at 5563-70 feet, and a drill-stem test at 5565-614 feet yielded 2800 feet of heavily oil- and gas-cut mud and 610 feet of salt water. The hole is bottomed at 5728 feet in Ellenburger, topped at 5689 feet.

Continental Oil Company's Lewis 2-B, northeast offset to its discovery for the Lewis-Stuart field, flowed 296 barrels of 40-gravity oil initial through 1-inch choke from Bend perforations at 6408-18 feet. The field has 7 producers, including 2 in the 6200-foot lime.

Grayson County: The Texas Company's Handy 5, Samuel Stewart Survey and offsetting 1600-foot Strawn production in the Handy field, proved a new Strawn zone in flowing 307 barrels of 39.8-gravity oil, with gas-oil ratio 375/1, on natural test through ¼-inch choke. This production is from a solid body of sand at 2102-62 feet. Nearby deep failures tend to discount the importance of this new zone, but the area is split by a series of faults.

New Method for Storing Gas Reduces Space Required

A new method of storing natural gas in liquid form which will reduce storage space by more than 99.8 percent has been developed by L. F. Stutzman, assistant professor of chemical engineering, and George H. Brown, instructor, at Northwestern University's Technological Institute. Under the method 800 cubic feet of natural gas may be contained in one cubic foot of storage space.

The development will have far-reaching effects on the conservation of gas from oil fields in the U. S., will help save the country's natural resources and will insure a high quality of natural gas for cooking and heating in households during periods when the drain on local facilities is great, it is claimed.

The Northwestern University scientists reduced the temperature of natural gas to 260 degrees below zero Fahrenheit by bringing it into contact with liquid nitrogen at a temperature of 320

Baash-Ross News

BAASH-ROSS TOOL COMPANY · LOS ANGELES · HOUSTON · NEW YORK

OUR 27th YEAR

You can *See* it in the Design!

Feel it in the Handling!

Check it on the Scales!

BAASH-ROSS "DU" ROTARY SLIPS ARE UNUSUALLY LIGHT WEIGHT

... and Light Weight is only ONE of *many* "DU" advantages!

Stop and think how many dozens of times the rotary slips are lifted by the drilling crew during a *single* round trip. Multiply this by repeated day-after-day, month-after-month operations and you can readily appreciate why light weight is such an important factor to look for in rotary slips. *And you really get light weight in Baash-Ross "DU" Rotary Slips!*

For example, check these figures on typical sizes of "DU" Slips . . .

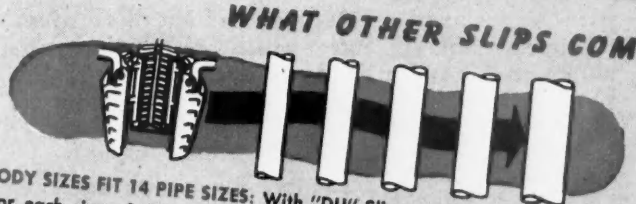
Size of "DU" Rotary Slips	"DU" Regular (12" long)	"DU" Long (16" long)
4½" O.D. Slips with 4½" Liners	137 lbs.	158 lbs.
5⅝" O.D. Slips with 5⅝" Liners	146 lbs.	177 lbs.
7" O.D. Slips with 7" Liners	154 lbs.	196 lbs.

On these and other sizes you'll find Baash-Ross "DU" Rotary Slips are pounds lighter because all excess metal has been removed without in any way sacrificing strength or ruggedness. *Notice the deeply-cored backs that replace dead metal with a cellular rib construction that combines more-than-ample strength with minimum weight.*

▶ But most important is the fact that unusually light weight is only *one* of many important advancements you get in Baash-Ross "DU" Rotary Slips. Carefully check through the features outlined below . . . compare them right down the line with *any other* make of slips . . . and you'll see why "DU" Rotary Slips are today's outstanding buy for maximum convenience, safety and all-around economy!

Baash-Ross "DU" Rotary Slips are available in both "Regular" length (12" long—for wells through 8000 ft. in depth) . . . and "Long" length (16" long—for the deepest wells and heaviest drill strings). For full details, see your nearest Baash-Ross representative—or write direct!

WHAT OTHER SLIPS COMBINE SO MANY OUTSTANDING ADVANTAGES?



▶ **3 BODY SIZES FIT 14 PIPE SIZES:** With "DU" Slips you don't need a separate slip for each size of drill pipe. By simply changing the liners—a quick inexpensive operation—*three* basic "DU" body sizes fit *all* sizes of tubing, drill pipe and casing from 2⅜" O.D. through 7" O.D. Cuts slip investment and maintenance to a minimum!

▶ **MONEY-SAVING SEGMENTED LINERS:** "DU" Slip Liners are in 4" segments instead of single long units. If you use both 12" and 16" Slips there's no need to stock liners for both sizes. Simply keep a supply of 4" segments on hand—use *three* 4" segments for 12" Slips . . . *four* 4" segments for 16" Slips . . . thus greatly reducing inventory costs.

Also, if for any reason slip wear is concentrated at one point, liner segments can be switched or inverted to distribute wear without replacing any parts. Or if too worn, replace *only* the worn segments and use the others for additional service. Cuts maintenance costs to the bone!

▶ **SELF-ALIGNING HINGE:** "DU" Body Segments are not merely hinged together, but are unitized by a unique "floating" hinge that prevents vertical misalignment, yet permits them to adjust laterally to any irregularities in bore of master bushing. This assures a full, uniform grip under all conditions!

▶ **SAFETY LINER RETENTION:** "DU" Slips are so designed that *all* stresses—both of supporting the pipe and of breaking out joints—are transmitted directly from the liners to the slip body. *There are no retaining bolts or pins to become sheared and allow liners to fall into hole.* Yet liner segments can be quickly removed by simply pulling a cotter and sliding out one keystone retaining key. This double keystone key firmly mates liners and body into single rigid unit!

▶ **AND OTHER ADVANTAGES:** There are still other vital "DU" advantages . . . the safety loops on the handles that safeguard crew's hands against injury . . . the polished backs that eliminate sticking in the bore . . . the perfected grip design that will not damage the pipe . . . the flattened toes that enable "DU" Slips to stand solidly on table or floor . . . and many other unique features.

BEFORE YOU BUY ANY ROTARY SLIPS GET THE COMPLETE STORY ON "DU" ALL-AROUND SUPERIORITY!

degrees below zero during a seven-month study on a huge research project which revealed that the gas could be stored economically in liquid form.

Through the use of refrigeration equipment and insulated tanks Stutzman and Brown were able to show that large storage tanks can be eliminated or used for additional storage so that a community will have an adequate supply of gas on hand at all times. The liquid gas may be returned to its gaseous state by reducing refrigeration and piping the gas off a storage tank and into gas mains.

• East Texas

Wildcats in Van Zandt and Cherokee Counties Fail

Wildcat failures in Van Zandt and Cherokee counties; Anderson County wildcat dry in Upper Rodessa; Rodessa-pay discovery for Hawkins field to induce more development although gas-distillate yield is small.

Failures: Humble Oil & Refining Company's McCord 1, Van Zandt County wildcat, entered the Travis Peak at 8346 feet and was abandoned at 8513 feet.

Cherokee County: Al Brown and Delta Drilling Company's Baily-Sun 1, John Russell Survey, reached water in drilling Woodbine to 4392 feet.

Anderson County: Sanders and Murchison's Broadway 1, projected Travis Peak test for the East Blackfoot area, logged the Massive Anhydrite-Bacon contact at 8840 feet, and was without shows in drilling at 8870 feet. Continental Oil Company and Byrd & Frost, Inc.'s Royall 1, Slocum area, was drilling shaley-lime at 8355 feet.

Freestone County: The Texas Company's Irvin 1, Francis O'Neal Survey and a mile south of 8000-foot gas production in the Fairfield multi-pay field, passed up Woodbine zone, topped at 4470 feet, without making a test, and was drilling at 6130 feet.

Hawkins Deep Pay: Humble Oil & Refining Company's McKnight 1, W. R. James Survey and 3700 feet northeast of Woodbine production, was correcting tubing leak after gauging 787,416 feet of gas, with spray of distillate, on 23-hour test through ¾-inch choke. This production is from Rodessa open hole at 8935-65 feet, which was treated with acid. Shutin pressure tests registered maximum bottom-hole pressure of 3831 pounds, while pressure on tubing and casing built up to 2800 pounds and 1700 pounds, respectively. McKnight 1 was plugged back from salt at 14,629 feet, having set a new depth record for the district.

Humble's Geo. R. Phillips 1, James McAnulty Survey, tested dry in Sub-Clarksville and Woodbine zones, and was drilling at 5100 feet to try for production in the Rodessa. Humble recently completed a Travis Peak failure on the west side of the Hawkins dome.

Harrison County: Stanolind Oil & Gas Company's wildcat, George Slaughter 1, J. E. White Survey, is drilling below 7837 feet in sand and shale. Travis Peak was topped at 6561 feet.

Southern Production Company's wildcat W. H. Cargill Estate 1, P. Dougherty Survey, is drilling below 3019 feet.

Legislation Would Amend Leasing of Montana Lands

Legislation to amend the act under which Montana was admitted as a state so as to permit the granting of oil leases for longer than 20 years has been introduced in Congress by Senator Zales N. Ecton.

Ecton explained that the act of admission provided the state could not lease its public lands for mineral development for periods longer than 20 years, and that the Montana Legislature has passed a resolution requesting the amendment. Under the bill, the legislature could set the maximum term for oil leases on state lands.

Veterans Complete Training

Seventeen war veterans from West Coast Colleges and one Hollander have completed 12 weeks of training with Standard-Vacuum Oil Company for sales positions in India, China, Japan, Netherlands East Indies, Malaya, Siam and the Philippines. Standard-Vacuum and affiliated companies supply petroleum products throughout the Far East, Australasia, South and East Africa.

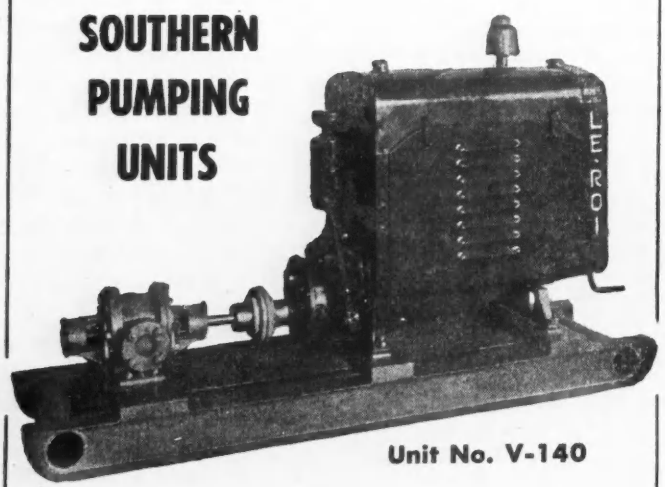
• South Central Texas

Test in Green Branch Field Completed from Open Hole

Green Branch field test completed from open hole; Humble stakes northeast outpost at Charlotte; Frio County wildcat drills below 10,403 feet.

McMullen County: Skinner & Edy &

SOUTHERN PUMPING UNITS



Unit No. V-140

Le Roi Power Unit — Viking Pump. Capacity 140 barrels per hour.

Complete units and replacements in Houston and Kilgore stocks.

SOUTHERN ENGINE & PUMP COMPANY

MANUFACTURERS • MACHINERY FACTORS • CONTRACTORS

Houston - Dallas - Kilgore - San Antonio - Edinburg

ACIDIZING HANDBOOK

(Rewritten)

By BENSON M. KINGSTON

A rewritten and up-to-date version of a popular book for both technical and practical personnel on a most important subject.

Acidizing Handbook Covers the entire field of the chemical treatment of oil and gas wells in concise and understandable language. All of the problems pertaining to acidizing are fully discussed.

The book is divided into 15 chapters which include: The Chemistry and Geology of Treatment—Treating Acid—Special Types of Treating Solutions—Mechanics of Treatment (5 Chapters)—The Relation of Salt Water to Treatment.

The Appendix to the book includes eleven pages of excellent tables and a complete bibliography of magazine articles and other literature dealing with acidizing (69).

The author is a member of the A.I.M.E. and the A.P.I. and has had over fifteen years of experience in acidizing oil and gas wells. He is at present chief petroleum engineer for the Chemical Process Company.

Price $2.50

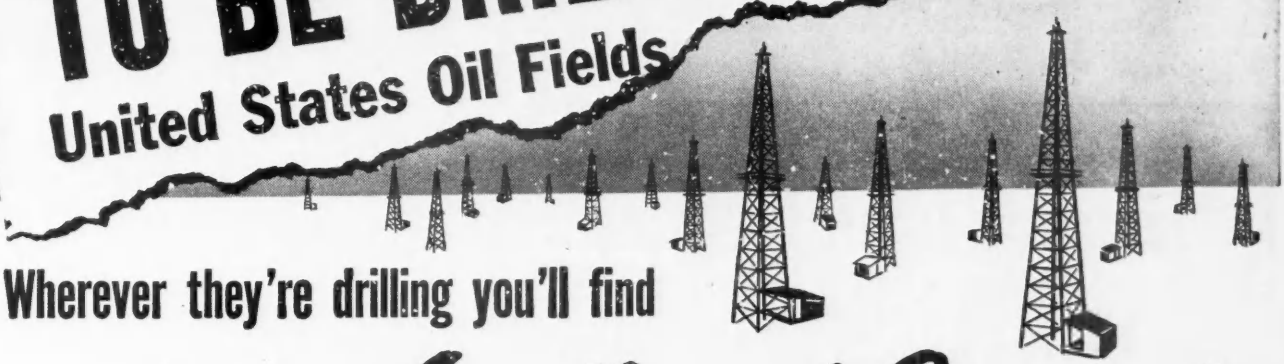
Send orders to

THE GULF PUBLISHING COMPANY

P. O. BOX 2608 HOUSTON, TEXAS

30,000 NEW WELLS TO BE DRILLED IN '47

United States Oil Fields



Wherever they're drilling you'll find

Aeroflo and Quadrafos

CYANAMID'S "PROVED-IN-USE" DRILLING MUD COMPOUNDS

Speed and economy are the major requirements for 1947's big, busy drilling program, largest in the nation's history.

QUADRAFOS* (Sodium Tetraphosphate) speeds and simplifies drilling where conglomerate, sand, silty shales are drilled and the formation lacks sufficient colloidal material. Strength and rate of gel caused by dispersion, heat and salt water are efficiently controlled, and calcium and magnesium effects rendered inactive. In addition . . .

AEROFLO* Mud Conditioning Compound is especially efficient for improving mud in deep wells, where high temperatures tend to cause rapid thickening. AEROFLO also makes phosphates more efficient in salt cut muds, and in muds that resist routine chemical treatment. It facilitates, too, the elimination of sand.

Produced in large volume under careful chemical control, AEROFLO and QUADRAFOS are of maximum uniformity and highest quality. For complete information, or on-the-job help with your problems, call, write or wire American Cyanamid Company, 229 Shell Bldg., Houston, Texas, or Azusa, California.

When Performance Counts—Call on Cyanamid

*Reg. U. S. Pat. Off.

†QUADRAFOS and ‡AEROFLO are distributed from stocks kept by many drilling mud chemical distributing houses in all principal oil well drilling centers in the United States.

‡AMERICAN CYANAMID COMPANY
(Manufacturer and Selling Agent)

†RUMFORD CHEMICAL WORKS
(Manufacturer)

†AMERICAN CYANAMID COMPANY
(Selling Agent)

"Give Your Bits a Break," says General Mud, ". . . the right kind of break, that is. Control the lubricating and other properties of your drilling mud with AEROFLO and QUADRAFOS. You'll get longer life and more footage per bit . . . and do more economically your share of the 107,000,000 feet you oil fellows are planning to drill this year."

AMERICAN Cyanamid COMPANY

Industrial Chemicals Division

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Newman Brothers' South Texas Syndicate 4-A is being completed as a producer at Green Branch field. A drill-stem test at 2281-91 feet, lasting 1 hour, recovered 1750 feet of oil and fresh water, bottom hole pressure flowing being 440 pounds. Another test at 3956-57 feet, lasting 1 hour, recovered 1490 feet of oil and a little mud and fresh water. Total depth is 3957 feet with 5½-inch casing set to 3952 feet and completion being from open hole.

Atascosa County: Humble Oil & Refining Company has staked J. B. Henry et ux 2 as a new northeast outpost at Charlotte field. The test is 467 feet from the northwest and northeast lines of J. Poitevent Survey 5, Lot 39, Charlotte Gardens Subdivision, on a 287.6-acre lease. It is also 1930 feet northeast of Humble's Henry 1, recent northeast extension for the field. It is to be drilled to 5400 feet in the Navarro sands.

Frio County: Magnolia Petroleum Company's deep wildcat 6½ miles northeast of Pearsall, the Wm. McKinley 1, is below 10,403 feet after running electrical log to 10,128 feet. Scheduled total depth is 12,000 feet.

Line Breaks, Man Burned

One man was burned seriously when an Oklahoma Natural Gas Company pipe line burst near Kellyville, Okla., setting fire to the Frisco Railroad's right-of-way and delaying train traffic for an hour. The break occurred at Polecat Junction, about 20 miles from Tulsa. ONG officials identified the man as Earl Gipson of Mounds, Okla., a company employe.

Empire Trust Company

NEW YORK

Capital Funds . . . $8,673,859.19
Total Resources . . $124,605,094.23

Directors

DEAN MATHEY
Chairman of the Board
HENRY C. BRUNIE
President
FRANK V. BALDWIN
Retired
NED G. BEGLE
Chairman, B.F.D. Co.
EVERETTE L. DeGOLYER
DeGolyer & MacNaughton
Dallas, Texas
GEORGE A. EASLEY
Vice President, Salt Dome Oil Corp
DEAN S. EDMONDS
Pennie, Edmonds, Morton & Barrows
CHARLES S. GARLAND
Alex. Brown & Sons
Baltimore, Maryland
ARCHIBALD A. GULICK
Alexander & Green
PAUL H. HUDSON
Executive Vice President and Secretary
GRAHAM D. MATTISON
Dominick & Dominick, New York
DONALD H. McLAUGHLIN
President, Homestake Mining Co.
JULIAN S. MYRICK
Vice President
Mutual Life Insurance Co.
ARTHUR A. SEELIGSON
President, Transwestern Royalty Co.
San Antonio, Texas
JAMES H. VAN ALEN
Vice President, Farrar, Straus and Co., Inc.

Specialized experience is available for study and suggestions as to sound financing of oil properties.

Main Office
120 BROADWAY, NEW YORK

Fifth Avenue Office
580 FIFTH AVENUE

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

• Southwest Texas—Lower Coast

Dual Completion Permit for Aransas Discovery Is Sought

Potential run on Aransas County discovery; Magnolia tests shallow discovery in Duval County; gas and salt water tested in wildcat west of Peters field; gas condensate production at McAllen field extended ¾ mile east; Lacy field production being extended 4000 feet north.

Aransas County: William Herbert Hunt Trust Estate's Spencer-Crane 1, wildcat on Live Oak Peninsula 4½ miles north of Rockport, has been completed as a discovery. On potential the well flowed 185 barrels of oil daily through 9/64-inch choke with 1200 pounds tubing pressure and gas-oil ratio 858/1. Total depth is 8370 feet with casing perforated at 7126-36 feet for completion. Hearing has been set for August 27 by the Texas Railroad Commission for permission to dually complete, the well having tested gas and condensate from perforations at 7058-65 feet.

Duval County: Magnolia Petroleum Company is completing a shallow discovery in the "76" field area approximately 2 miles south of Casa Blanca field and 4 miles west of Government Wells field. A drill-stem test at 1297-1308 feet in the top of the Cole sand developed 272 pounds working pressure and recovered 320 feet of gas-cut mud, bottom hole pressure flowing being 500 pounds. Another test at 1322-29 feet recovered 780 feet of oil and 30 feet of sand in 45 minutes with 4 pounds working pressure. Total depth is 1329 feet with 7-inch casing on bottom.

Edwin B. Cox et al's W. R. Peters Estate 1-B, wildcat 2 miles west of Peters field, is drilling after testing gas and salt water at the 2300-foot level. The well developed 200 pounds working pressure, flowed gas and recovered salt water on a drill-stem test at 2362-65 feet, using ¼-inch chokes top and bottom, tool being open 20 minutes. Scheduled total depth is 3200 feet.

Hidalgo County: Coastal Refineries et al's J. J. Lynn 1 has extended 7500-foot gas-condensate productio at McAllen field ¾ mile east. From perforations at 7500-40 feet the well flowed 4,150,000 cubic feet of gas daily on ¼-inch choke with 2750 pounds tubing pressure. Estimated open flow is 32 million cubic feet of gas daily.

Cameron County: Lacy field production is being extended approximately 4000 feet north by Rogers Lacy Production Company's Crain and Griffiths 5. The well is being completed from perforations at 7492-502 feet in the 7500-foot gas-condensate pay zone. Total depth is 7643 feet with 5½-inch casing set to 7550 feet.

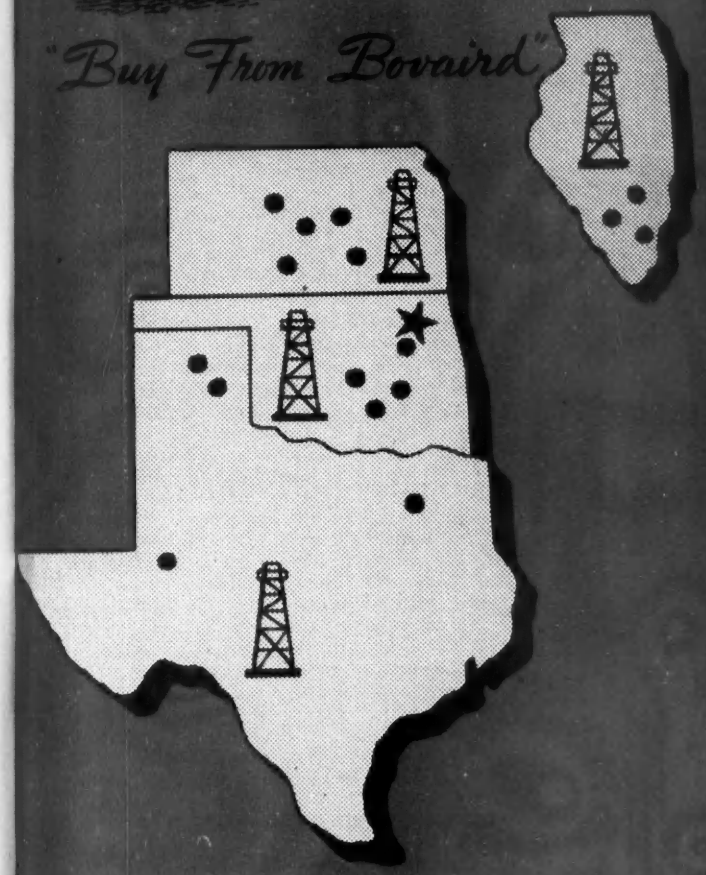
• Middle Texas Coast

Gas-Condensate Discovery in Hallettsville Area Completed

Gas condensate discovery north of Hallettsville completed and waiting on potential; extension test east of Hords Creek-Wilcox discovery sets casing for production test; casing set in wildcat 2 miles southwest of Yoward field; Continental still testing in wildcat northeast of Clay West field.

The BOVAIRD NETWORK

"Buy From Bovaird"



ILLINOIS
Clay City
Grayville
Salem

KANSAS
Chase
McPherson
Pratt
Russell
Wichita

OKLAHOMA
Oklahoma City
Pauls Valley
Sapulpa
Seminole

TEXAS
Borger
Dallas
Odessa
Pampa

PROVIDES FAST DEPENDABLE SUPPLY SERVICE FOR THE OIL INDUSTRY

SUPPLY BOVAIRD COMPANY

THE BOVAIRD SUPPLY CO.

GENERAL OFFICES: TULSA, OKLAHOMA

Lavaca County: Forest Oil Corporation's H. C. Obelgoner 1, gas-condensate discovery 2 miles north of Hallettsville, has been completed and was waiting on potential. Final perforations were made at 7511-16 feet. Prior tests at this level made gas and condensate with 1775 to 2300 pounds working pressure and bottom-hole pressures 3100 pounds flowing and 375 pounds shutin. Total depth is 9001 feet with 5½-inch casing set to 8375 feet.

Goliad County: Sunray Oil Corporation's Fanny Ray Pereira 1, extension test ¾ mile east of W. L. Goldston's Kauffmann 1, discovery at Hord's Creek-Wilcox field, has set casing for production tests. Casing has been set on bottom at 8051 feet and perforations will be made in the Luling sand for a possible gas-condensate producer. The pay was topped at 7916 feet and a drill-stem test at 7925-39 feet failed.

Bee County: Casing has been set in Rowan & Hope's Rio Oil Corporation 1, wildcat 2 miles southwest of Yoward field. Total depth is 7868 feet and tests in the Slick sand at 7525-65 feet recovered gas and condensate and a test lower in the Wilcox at 7841-68 feet also recovered gas and condensate.

Live Oak County: Continental Oil Company's Kitty West Burns 1, wildcat 7 miles southwest of George West townsite and 2 miles northeast of Clay West field, was testing for completion. From perforations at 10,170-90 and 10,236-48 feet the well flowed on latest test 1,970,000 cubic feet of gas and 2 barrels of condensate daily through ⅛-inch choke. Total depth is 10,338 feet with 5-inch liner on bottom.

• Upper Texas Coast

Gas-Condensate Production Opened in Cedar Bayou Area

Gas-condensate producing area opened southeast of Cedar Bayou field; Evergreen discovery plugged back and completed in Cockfield; Burleson County discovery given potential; Sugar Valley east flank test completed.

Chambers County: A gas-condensate discovery southeast of Cedar Bayou field is Kirby Petroleum Company's Fee 1, (Tract 20), C. Smith Survey A-22. Total depth is 8015 feet with casing perforated at 6312-16 feet where the well flowed a potential gauge of 38½ barrels of 49.6-gravity condensate plus 1¼ million cubic feet of gas daily. Flow was through 3/16-inch choke with 2125 pounds tubing pressure and 2300 pounds casing pressure. This producer is a mile southeast of Rayzor et al's Muckelroy-Frymire Unit 1 gas well.

San Jacinto County: Mac Drilling Company's Cynthia Payne 1, discovery 4 miles south of Evergreen townsite and originally completed as a Wilcox producer, has been plugged back and completed in the Cockfield. Original Wilcox completion was at 7682-702 feet in April, the well gradually going to salt water. On rework, hole was plugged back and casing perforated at 4592-96 feet in the Cockfield, flowing on potential 126 barrels of 42.6-gravity oil daily through 12/64-inch choke with flowing pressure on tubing 450 pounds and gas-oil ratio 376/1.

Burleson County: A discovery is Cresslenn Oil Company's Nellie K. Gramm 1, Eliza Sante Survey and approximately 300 feet east of a 6241-foot dry hole. The well has been completed for 18¾ barrels of 38.3-gravity oil daily on pump from perforations at 3440-50 feet, gas-oil ratio 500/1. Total depth is 3495 feet.

Matagorda County: Stanolind Oil & Gas Company's Helen E. Hurlock B-5, outpost on the east flank of Sugar Valley field, has been given potential test. The well gauged 129 barrels of 33.1-gravity oil daily through 7/64-inch choke with tubing pressure 1100 pounds and casing pressure 1180 pounds. Completion is from perforations at 8990-9000 feet.

Geological Survey Issues Chart on Tertiary Strata

A chart showing new correlations of Tertiary strata in Mississippi, Alabama, Georgia, and Florida, the source rocks of a large part of the non-metallic resources of those states, key beds of which are used by petroleum geologists for working out underground structure in the search for new oil fields, has been published by the Geological Survey.

The new chart, survey officials said, embodies concepts of the correlation of surface formations within the area based on intensive studies of the past several years which have led to changes in views on correlation of the Tertiary formations.

The chart is listed as Chart 29 of the Oil and Gas investigations series and is available, at 20 cents a copy, from the Washington office.

• South Louisiana

Potential Run on Eola Field Southwest Flank Discovery

Potential run on Eola field southwest flank discovery; Magnolia drives piling for 2 new Gulf of Mexico wildcats; third producer for new Holmwood field being completed; Texas makes test in 15,523-foot Jefferson Parish wildcat; Gulf tests new sand in Lake Hermitage extension try.

Avoyelles Parish: Potential has been run on The Atlantic Refining Company's Haas Investment Company 1, south flank discovery at Eola field. The well gauged 186 barrels of 44.7-gravity oil daily through 10/64-inch choke with gas-oil ratio 1015/1 and flowing pressure on tubing 1000 pounds. Total depth is 8661 feet with casing perforated in the Wilcox at 8562-72 feet for completion. This area has been named Southwest Eola and is a little over a mile south of production in Eola field.

St. Mary Parish: Magnolia Petroleum Company has abandoned State 1 (Lease 684), wildcat in the Gulf of Mexico in Block 94 and is driving piling for immediate operations on 2 wildcats offshore from Terrebonne Parish. Ship Shoal 1 (Lease 766) is on Block 72 8 miles south of Coon Point. This is to be a 13,500-foot test. South Pelto 1 (Lease 791). Block 11, is 10 miles south of production at Lake Pelto field.
feet.

Calcasieu Parish: A producer in the recently discovered Holmwood field is Sohio Petroleum Company and Gulf Refining Company's W. E. Walker et al 2, 26-10s-7w. Total depth is 10,600 feet with 5½-inch casing set a foot off bottom and perforated at 10,356-66 feet for

Senile Sociology

Millions in America are in the same category with canary birds, parrots, house cats and pet squirrels, except that we are more demanding and have no self-respect. If we are unemployed, government takes care of us. If the boss thinks us lazy or unqualified, we have union protection. We plot and plan like morons to circumvent the laws of supply and demand, robbing Peter to pay Paul. In the short span of a New Deal regime we have become moral and social weaklings, looking to government and unions for succor and solace. We have no ambition, no foresight, no self-dependence. Soon we shall have no independence. Another great nation has topped the divide between ascendancy and decline. We're still smiling. It's just a case where realism sounds like pessimism.

WE'VE SUPPLIED OIL MEN IN OUR AREA FOR 39 YEARS

PELICAN WELL TOOL & SUPPLY CO.

SHREVEPORT
LOUISIANA

PELCO

Berwick
New Iberia
Lake Charles

Don't let BAD RUNNING CONDITIONS stop your OFF-THE-ROAD HAULING!

Keep your loads moving with WALTER TRACTOR TRUCKS

WHY lose valuable drilling and servicing time because your transportation depends on weather and running conditions? Get enormous loads through to location—no matter how "impossible" the terrain or remote the site—with the unsurpassed haulpower of Walter Tractor Trucks.

Only Walter Tractor Trucks offer you the 100% traction of 4-Point Positive Drive to meet gruelling off-the-road conditions. In this *continuous* all-wheel drive, three automatic locking differentials concentrate full engine power on the wheels having the most traction. Even if *three* wheels lose traction . . . the working mate carries on. This means no wasteful wheel-spinning but unfailing power and traction which moves tremendous loads and rigs through soft dirt, mud, sand, snow, slippery surfaces and steep grades without bogging down.

For more than 25 years, Walter Tractor Trucks have been "making their own roads" through difficult terrain . . . getting heavy loads through on time. Write today for further details about the many other Walter engineering advancements, such as suspended double reduction drive, tractor type transmission, short wheelbase, hydraulic steering, powerful air brakes. Illustrated literature available on request.

Models from 125 h.p. to 350 h.p.

WALTER MOTOR TRUCK COMPANY
1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N.Y.

WALTER TRACTOR TRUCKS

completion. This is the third producing well in this area.

Jefferson Parish: The Texas Company was preparing to make production tests in the Lafourche Basin Levee District 1, deep wildcat in the Queen Bess Island area that bottoms at 15,523 feet. Casing has been set to 13,998 feet and a squeeze job made at 13,916-18 feet in preparation for the initial production test.

Plaquemines Parish: Gulf's Lafourche Basin Levee District 17, extension test 2500 feet west of production in the Lake Hermitage field, was testing a new pay. Total depth is 12,091 feet with 5½-inch casing set to 12,067 feet and perforated at 11,895-954 feet for initial test. Regular pay for the Lake Hermitage field is at the 9100- and 9300-foot levels.

• North Louisiana

Caddo Wildcat Takes Gauge; Ora Well Is Good Producer

Caddo Parish wildcat takes official gauge; second Ora well is rated good producer; Logansport wildcat resumes drilling.

Caddo Parish: Charles C. Lowery's Stiles 1, wildcat in 18-21n-16w, completed for oil production from the 2290-442-foot zone. The well is flowing an estimated 40 barrels of oil per day. Total depth is 2512 feet.

Union Parish: The second well for the new Ora field was completed as Shell Oil Company's Frost Lumber Company 4-A, C SE SE NE 23-22n-1w, was gauged at 137 barrels of 28.4-gravity oil in 24 hours, through 3/16-inch choke, best completion to date in the field. Drilling continues active there despite dry holes and salt water encroachments.

C. H. Murphy, Jr., is completing his first producer for the field, Neva Norris 1, C NE SE NW 26-22n-1w, a west offset to the discovery, now flowing 50 barrels of oil and 40-50 barrels of salt water per day through ¼-inch choke. Murphy's well flowed oil and gas on drill-stem test at 2156-73 feet. Total depth is 2203 feet.

Marine Oil Company is preparing to perforate for production test at Monzingo-Rivers Lumber Company 2, 23-22n-1w, a southwest diagonal offset to the field discovery.

A rank wildcat, 4 miles west of Ora field, is Fletcher & Sneed's R. F. Ward 1, C NE SE NW 30-22n-1w, now drilling below 1220 feet.

De Soto Parish: E. C. Laster et al's wildcat Alice D. Witherspoon 1, C SW SE NW 3-14s-14w, in the Kickapoo area, took a drill-stem test of the Rodessa porous section from 5247-5384 feet, but packer failed to hold and another test probably will be attempted. Recovery was 7 stands of mud with gas bubbles. The well logged porosity at 5255-65 and 5305-15 feet.

Skelly Oil Company's important wildcat, Thelma Nash 1, SW NE 20-12n-16w, deep test on the flank of the Logansport field, is drilling slowly below 8625 feet. Drilling was suspended while protective casing was run to 6205 feet.

Natchitoches Parish: H. C. Cockburn's Louisiana Long Leaf Lumber Company 1, NW NW 11-8n-8w, has cemented 7-inch protective casing at 6628 feet and is drilling toward contract depth of 7600-feet in the Rodessa section. Casing was run to protect the hole and to eliminate salt water and gas flow from undetermined level.

Bossier Parish: Mayfield Drilling Company's W. I. Scott-Stewart 1, wildcat in the Bellevue field, 24-19n-11w, cored Blossom sand from 1605-21 feet and recovered nothing of value. Drill-stem tests failed, and drilling was resumed below 1621 feet.

M. A. Halsey is testing a 2700-foot zone in Harold Skidmore A-1, C SE NE 1-16n-11w. The area is near Lake Bistineau, and is a north offset to H. C. Owens Skidmore 1, abandoned at 5365 feet after failing to complete from the Pettit lime. Halsey's well went to 5800 feet without shows, and plugged back to the shallow zone.

New Lube Plant Planned

Cities Service Oil Company and Continental Oil Company are reported planning to construct jointly at Lake Charles, La., new refining facilities which will cost about $30 million. The major unit will be a new lube plant, the report said.

• Arkansas

Several Projected Wildcats To Break Lull in Activity

Little activity reported in state; several wildcats drilling and 2 preparing to drill.

Lafayette County: N. H. Wheless' T. R. Knighton 1, NW NW 8-15s-24w, is

AMERICAN ROLLER BEARINGS of all types are built specifically to "bear up" under the terrific stresses and strains encountered in the world's most powerful industrial and oil country machinery. Their superior strength, long life and proven ability to render smooth, quiet, trouble-free service has made them favorites with heavy equipment manufacturers for more than 25 years.

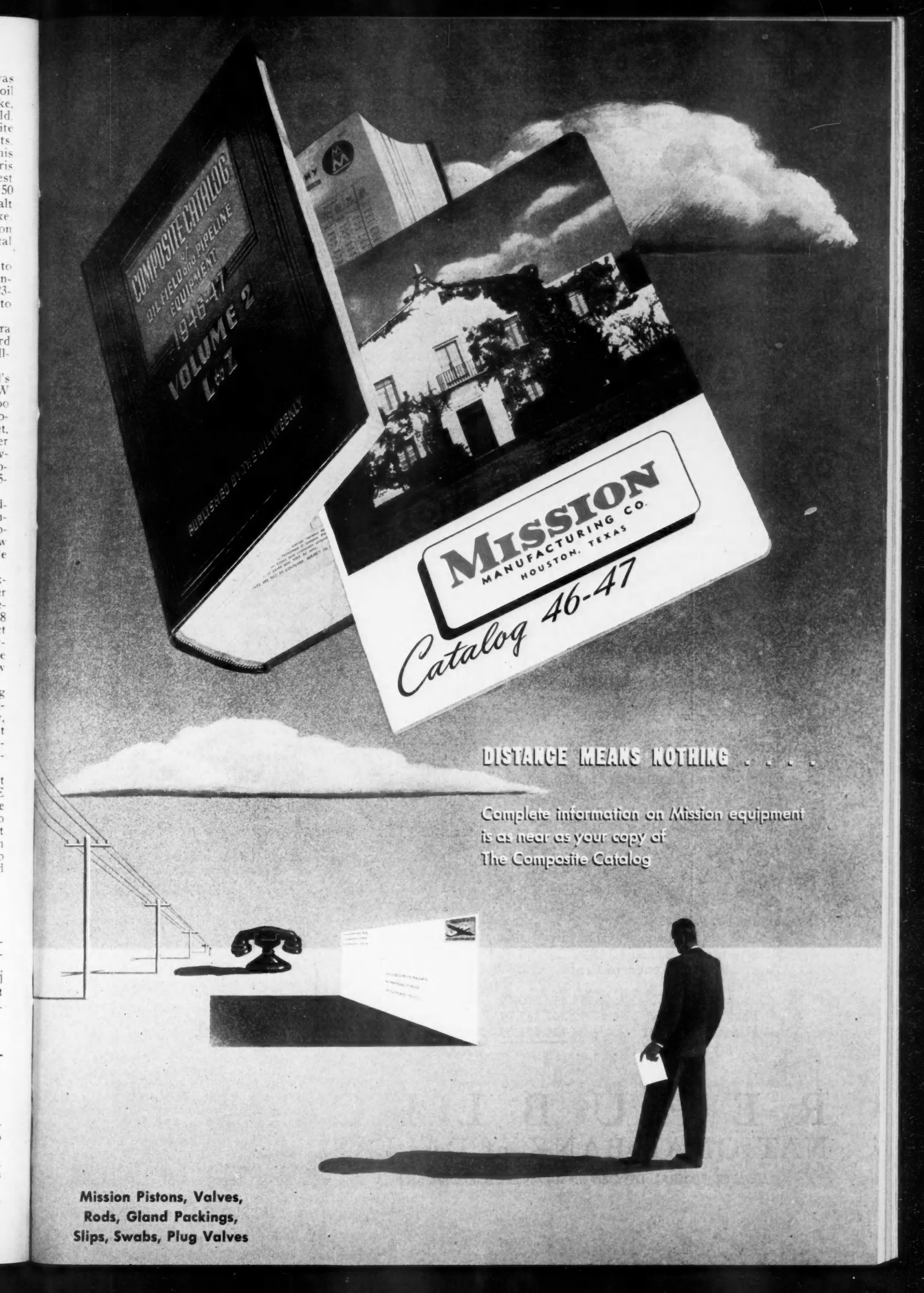
Why don't *you* specify AMERICANS for your next *heavy-duty* application? Our engineers will gladly cooperate in solving all your roller bearing problems.

AMERICAN ROLLER BEARING COMPANY

PITTSBURGH PENNSYLVANIA

Pacific Coast Office: 1718 S. Flower St., Los Angeles, California

AMERICAN
Heavy-Duty **ROLLER BEARINGS**


COMPOSITE CATALOG
OF
OIL FIELD AND PIPELINE
EQUIPMENT
1946-47
VOLUME 2
PUBLISHED BY THE OIL WEEKLY
MISSION
MANUFACTURING CO.
HOUSTON, TEXAS
Catalog 46-47
DISTANCE MEANS NOTHING . . . .
Complete information on Mission equipment
is as near as your copy of
The Composite Catalog
Mission Pistons, Valves,
Rods, Gland Packings,
Slips, Swabs, Plug Valves

drilling below 3643 feet. The test will go to the Smackover, and is 1¾ miles west of the Midway field.

Second wildcat in the county, W. H. Oberthier's Mordica Brown 1, C SE SE SW 26-15s-24w, 2½ miles south of the Midway field, is below 3413 feet. Tokio was topped by samples at 2400 feet.

Nevada County: Hunt Oil Company-Arkansas Fuel Oil Company's wildcat Bodcaw Oil Company 1, C SW NW 36-14s-23w, 6 miles northeast of the Midway field, is drilling below 5451 feet without showings. It will seek Smackover production.

Little River County: Frank and George Frankel's wildcat Nannie Locke 1, C NE NW NW 19-13s-30w, Smackover lime test to 4900-feet, is drilling below 2430 feet in red shale and sand.

• Mississippi

Jones County Test Recovers Deepest Shows Found in State

Jones County test cores saturated sand at 12,545 feet; closely-watched Yazoo County wildcat abandoned; Sharkey platform tests fail; Mallalieu field extension try moves out rig.

Jones County: Gulf Refining Company's L. L. Majors 1, SEc NE 29-6n-11w, lower Cretaceous test, has cored 12 feet of saturated sand at 12,545-57 feet for the deepest shows ever encountered in this state. It was indicated that the gravity of the oil recovered was 28.7 but whether it exists in commercial quantities has not been reported. Subsequent cores at 12,557-636 feet recovered shale and lime. Union Sulphur Company's Earline Parker 1, NEc 31-10n-10w, which had earlier reported shows of oil in the Eutaw zone is running core tests in the Lower Tuscaloosa and Massive sand sections. A drill-stem test at 6921-32 feet recovered salt water cut with slight amounts of oil. Cores at 6932-78 feet recovered shale with sand stringers. Later cores at 7058-70 feet recovered medium-to-coarse-grained sand with salt water.

Yazoo County: The Carter Oil Company's Medie Morgan 1, SW NE 9-12n-3w, wildcat which has been watched with interest, has been abandoned in the Comanchean. The Eutaw, Tuscaloosa and Massive sand sections were extensively cored but no shows were noted. R. Thomas McDermott's Pauline Gaddis 1, NW NW 32-10n-1w, Tuscaloosa test, was fishing drill stem. The well is working in the Eutaw zone topped at 6148 feet. No shows have been noted. Don Reese's W. T. Clark 1, NWc SE NW 8-12n-2w, is preparing to spud for a drive to the Tuscaloosa zone below 6000 feet.

Marion County: Humble Oil & Refining Company's Ernest R. Ford 1, SEc 20-1n-17w, has been abandoned at 9650 feet in the Comanchean. Shows of oil were reported to have been found in cores at 8892-96 feet in the lower Tuscaloosa but there was no evidence of commercial potentialities.

Washington County: C. H. Murphy Jr.-Sun Oil Company's E. J. Ganier 1, SE NW 30-15n-6w and W. B. Swain*1, SW SW 29-15n-5w, both being drilled on the flanks of the Sharkey platform, have been abandoned. Total depth at the Ganier was 4466 feet and at the Swain, 4312 feet. No shows were reported from either test.

Clarke County: T. J. Conway's A. L. Pippen 7, SWc NW 29-1n-18e in the Langsdale field, has been successfully completed to mark renewed activity in the field. After pump was installed the well pumped 90 barrels of 17-gravity oil per day. Conway has 2 other operations going in the field.

Lincoln County: C. H. Osmond's Grady Jordan 1, NW NE 29-6n-8e, attempted extension of the Mallalieu field, has moved out rig with no final information reported. Casing had been perforated in the Massive sand zone below 10,481 feet and tested some oil with salt water, but on later test showed dry. Humble's J. M. Chandler 1, SWc 8-6n-8e, in Mallalieu, has been successfully completed with an initial flow of 265 barrels of oil per day from oil sand at 10,377 feet. Activity in Mallalieu is rapidly increasing with 13 operations now under way.

Alabama

The state has 1 active wildcat operation since abandonment of Shell Oil Company's C. C. Brooks 1, NW NE 11-8n-1e, Clark County, at 5002 feet. Amerada Petroleum Company's D. H. Wright 1, NW SW 8-15n-10w, is drilling below 1202 feet.

In the Gilbertown field of Choctaw County, The Carter Oil Company's M. Adams 1, 4-10n-3w, perforated at 3293-318 feet and filled with 1300 feet of oil and water. Operators were running tubing to test.

Florida

Humble Oil & Refining Company's Gulf Coast Realty 9, C. SE¼ 24-48s-29e, Sunniland field of Collier County,

The people behind the figures

The figures on the statement tell you how strong Republic is but it is the people behind the figures that make your bank friendly. The extra interest in your problems, the quick action on your wishes, the PERSONAL attention to your financial affairs . . . these are the things that make the Republic the strong, friendly bank for you.

STATEMENT OF CONDITION JUNE 30, 1947

RESOURCES

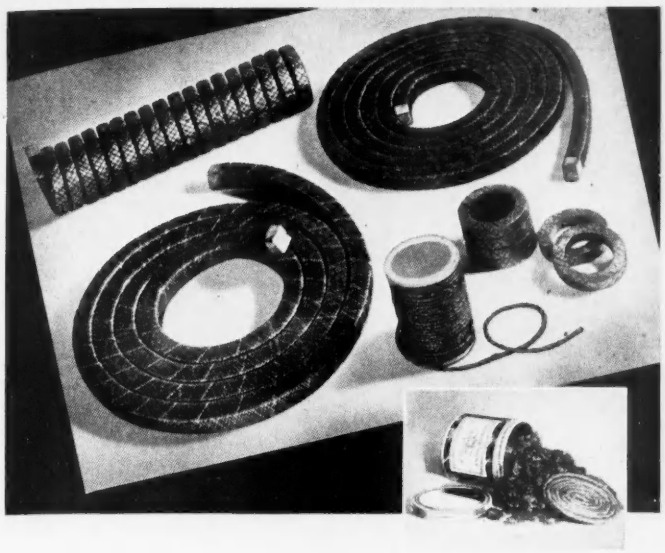
Cash and Due from Banks		$ 82,734,158.69
U. S. Government Securities		52,639,436.80
State, Municipal, and Other Securities		453,701.72
Stock in Federal Reserve Bank		600,000.00
Loans and Discounts		123,567,009.45
Banking House		2,205,128.43
Furniture and Fixtures		295,731.25
Real Estate for Bank Expansion		285,595.10
Customers Liability—Acceptances and Letters of Credit		659,009.67
TOTAL		$263,439,771.11

LIABILITIES

Capital	$ 10,000,000.00	
Surplus	10,000,000.00	$ 20,000,000.00
Undivided Profits		2,577,520.21
Reserve for Dividend, Payable July 1, 1947		200,000.00
Reserve for Taxes, Etc.		1,788,387.70
Acceptances and Letters of Credit		709,009.67
DEPOSITS:		
Individual	$165,232,646.45	
Banks	72,207,735.79	
U. S. Government	724,471.29	238,164,853.53
TOTAL		$263,439,771.11

REPUBLIC
NATIONAL BANK *of* DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION



Saves Time and Money!

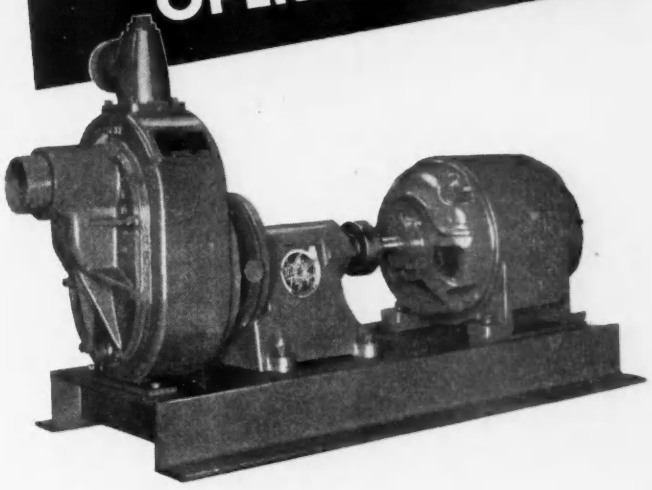
GARLOCK *Plastallic* packing is easy to apply. You just tamp the loose form into the stuffing box and draw up on the gland. Coil, spiral and ring forms are applied in the usual way. And when additional packing is needed, you merely back off the gland and add more *Plastallic*. In service it combines into one homogenous mass. A special feature of GARLOCK *Plastallic* coil packing is that it is out-of-square to fit either of two different packing spaces. Save with *Plastallic!*

Garlock 924 Plastallic—for strong mineral acids.
Garlock 926 Plastallic—for water, steam or air up to 550° F.
Garlock 927 Plastallic—for gasoline, oils, ether, etc., up to 550°F.
Garlock 928 Plastallic—for steam, oils or solvents up to 700° F.
Garlock 929 Plastallic—for water, steam and general services up to 550° F.
Garlock 930 Plastallic—for gasoline, oils, gases, etc., at temperatures up to 700° F.
Garlock 931 Plastallic—for steam, water or air at temperatures up to 700° F.

THE GARLOCK PACKING COMPANY, PALMYRA, N.Y.
Tulsa, Okla. Houston, Tex.
Los Angeles, Calif.

GARLOCK
Plastallic

This new kind of pump is REVOLUTIONIZING MANY HANDLING OPERATIONS



A Marlow Self-Purging Centrifugal makes many petroleum handling operations more efficient than they have ever been before.

- **Positively self-purging on suction lifts.**
- **Handles volatile liquids as easily as most pumps handle water.**
- **Does not vapor lock.**
- **Will operate in intermittent service and purge itself whenever necessary.**
- **Fitted with self-compensating dripless seal.**
- **Ruggedly constructed for long, hard service.**

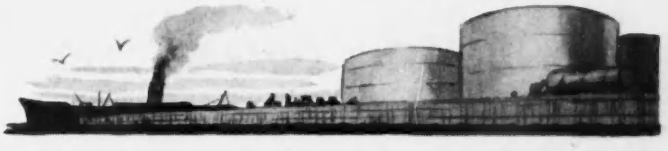
Models are made with electric, gasoline or Diesel power, 1½ to 4-inch sizes; capacities 70 to 930 barrels per hour. Details mailed promptly.

MARLOW PUMPS

546 Greenwood Avenue Ridgewood, New Jersey

Tulsa Office 226 E. 4th Street, Tel. 4-1380

MANUFACTURERS OF QUALITY PUMPS SINCE 1924



is continuing with tests after running into trouble with salt water. After productive section was acidized and tested, pump was installed and in initial test the well yielded 43 barrels of fluid per day of which 90 percent was salt water.

Palm Beach County: Humble's Tuscon Corporation 1, SWc 35-43s-40e, deep wildcat, is drilling below 12,846 feet with no shows reported below 8815 feet.

Franklin County: Magnolia Petroleum Company's A-1 State Block 5-B, offshore test in the upper part of the state, is drilling below 4757 feet. Hole was cored at 4590-4730 feet and recovered shale. No shows are reported.

Clay County: Humble's Foremost Properties 1, NE SW 4-6s-25e, is drilling below 5121 feet. Last cores reported at 3440-49 feet yielded dolomite with no shows.

Western Natural Gas Firm Buys Coquat Properties

Western Natural Gas Company has purchased the principal producing properties of Henderson Coquat in Live Oak and Bee counties, Texas, Paul Kayser, president of the purchasing company, has announced.

The price was $3½ million payable $1,750,000 in cash and the remainder out of three-sixteenths of the proceeds of the sale of products of any part of the properties.

The deal includes some 8000 acres of producing properties and about 16,000 acres of wildcat acreage.

Kayser said the company pruchased the properties to increase its gas reserves. Construction of a recycling plant in the area is planned.

• California

Salt Creek Field Test Has Flow of Oil from Oceanic

New pay discovery in Salt Creek field of Kern County flows 1080 barrels; small oil discovery made northwest of Athens field in Los Angeles County; Long Beach deep sand discovery has water trouble; Signal Oil & Gas Company acquires McCrate properties in Santa Maria Valley field; price boost further stimulates heavy oil development in old townlot field at Huntington Beach.

Kern County: Independent Exploration Company has made a new pay discovery in Salt Creek field. Cymric 11 in 21-29s-21e on a 30-minute test through 20/64-inch choke flowed at a 1080-barrel rate. Current production is 540 barrels of 38-2-gravity oil, 0.6 percent cut, through 15/64-inch choke with 920 pounds pressure on tubing and 1100 pounds on casing. Depth is 4923 feet with shutoff at 4847 feet. Oil is from Oceanic sand, productive in the Cymric field a short distance south, but heretomore unproductive at Salt Creek.

Rothschild-Bender Oil Operations' Sheep Springs 8, 1000 feet northwest of Independent's discovery, may have drilled into the gas cap of the new Oceanic pay. The well flowed 20 million cubic feet and some condensate on a short test 10 days ago before being shut in. Subsequent tests, however, have been much less impressive.

General Petroleum Corporation has staked a wildcat, Kernsumner 27, in 22-30s-28e, about 1 mile west of the Mountain View field in the Weed Patch area. Location is 1 mile north of the same company's Kernsumner 8, which was drilled to 7797 feet without showings, plugged back to 4250 feet, redrilled and cored directionally to the south to 7470 feet and abandoned in June, 1945.

Cal Oil & Gas Company's No. 3 wildcat in 30-29s-21e, ½ mile northeast of the Temblor field, is reported to have had oil and gas showings on the ditch at 1250 feet. Nearer the field in 31-29s-21e, Miller & York have staked a wildcat, F. O'Brien 1. Site is near Beverly Trading & Exploration Company's F O'Brien 1, abandoned at 2372 feet, and Calumet Gold Mines Company's F O'Brien 2, abandoned at 3012 feet.

Los Angeles County: Shell Oil Company has made a discovery of uncertain importance about 1 mile northwest of the Athens field on the southwest outskirts of Los Angeles in 12-3s-14w. Swab is bringing up oil at a 60-barrel rate and about 40 barrels of water from perforated interval at 8882-9255 feet.

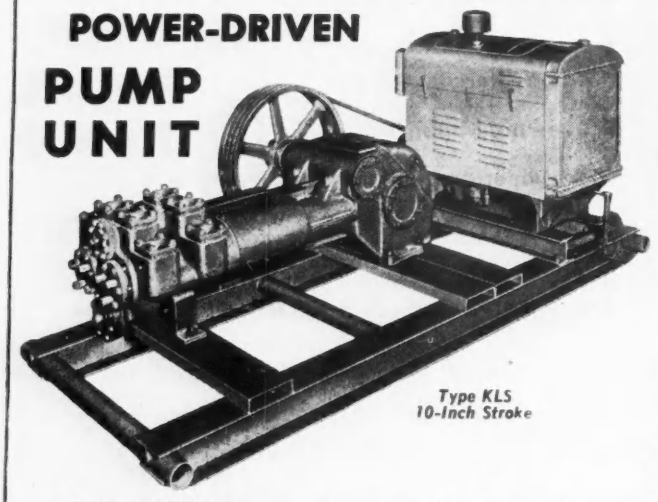
Shell has not made a statement on its Dolley 2 deep sand discovery in the Long Beach field. It is reported to be a very good well with high pressures, but considerable cut.

Seaboard Oil Company appears to have encountered the schist quite high in Johnson 1 near Lawndale, 17-3s-14w. Operator was reported preparing to test at 8020 feet.

In the Newhall area, Mutual Development Company is preparing to drill a wildcat in 10-3n-16w. Location is about 1 mile southwest of a non-commercial oil discovery made last year by Shell on the Braille Institute property.

Orange County: Recent 20-cent ad-

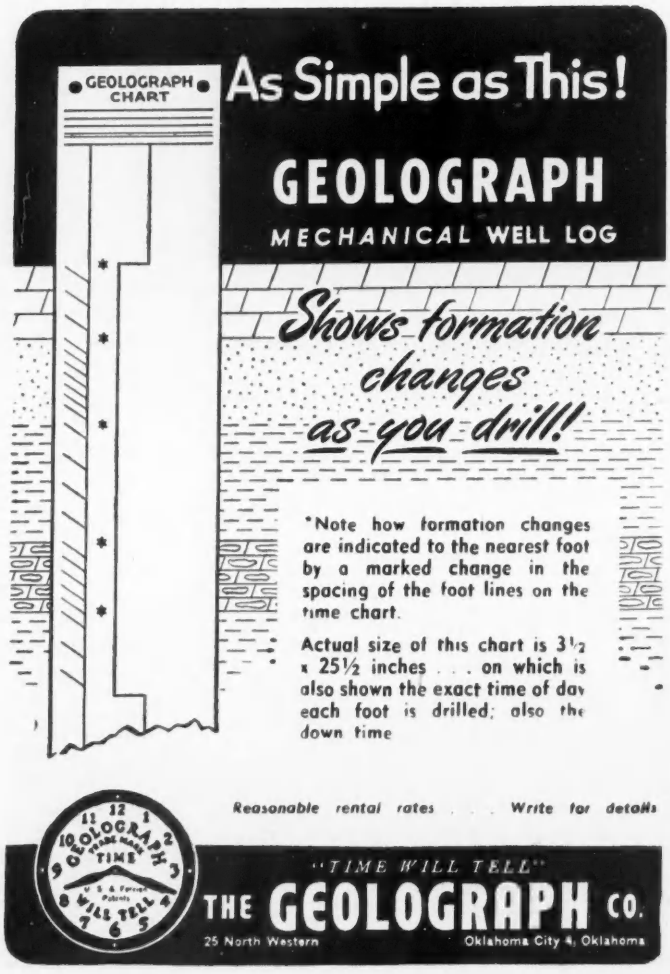
LOCKETT-WORTHINGTON
POWER-DRIVEN
PUMP
UNIT

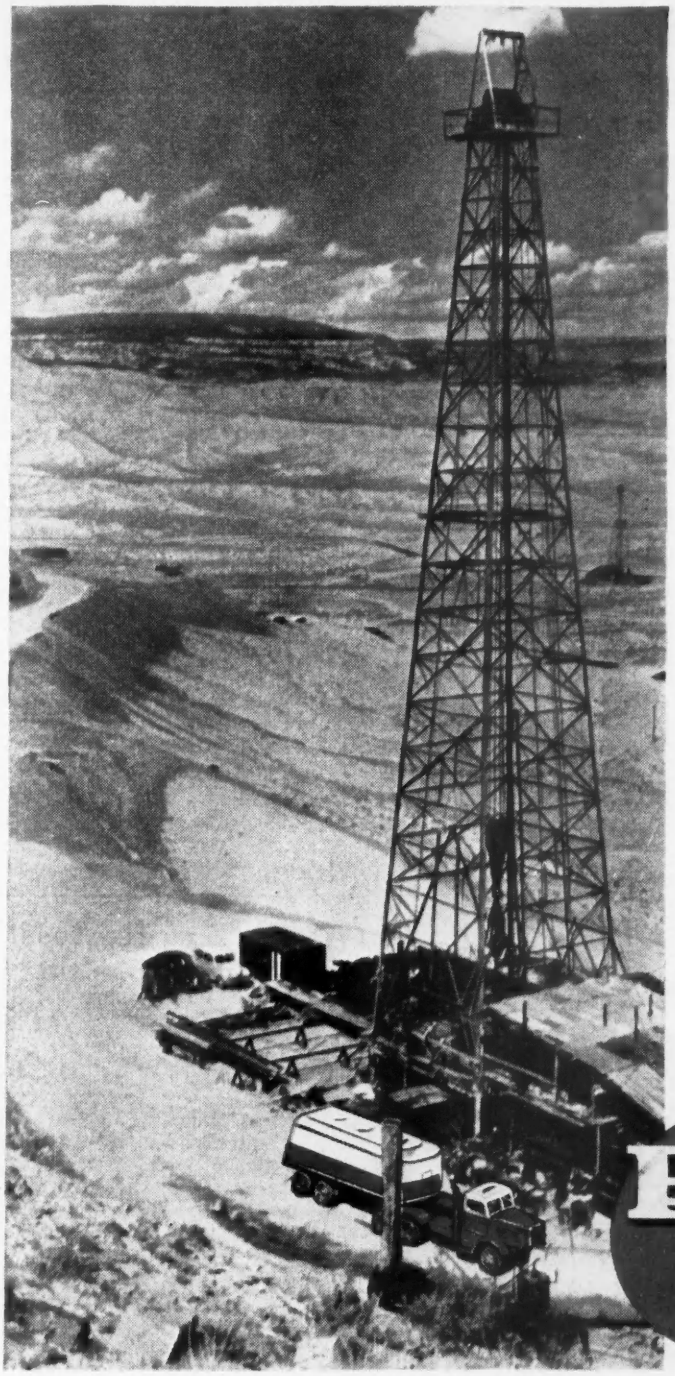


Type KLS
10-Inch Stroke

WORTHINGTON Pumps and *genuine* Worthington Repair Parts are available — through Lockett Dealers — from Warehouses maintained in the principal oil fields throughout Texas and Louisiana, backed up by a large replenishing stock at our Houston and New Orleans Warehouses. This enables Lockett Dealers to promptly supply needed equipment. Worthington Pumps are adaptable for use with Engines or Motors of any specified type or manufacture, to provide a complete pumping unit.

A. M. LOCKETT & COMPANY, LTD.
NEW ORLEANS HOUSTON DALLAS


GEOLOGRAPH CHART
As Simple as This!
GEOLOGRAPH
MECHANICAL WELL LOG
Shows formation changes as you drill!
*Note how formation changes are indicated to the nearest foot by a marked change in the spacing of the foot lines on the time chart.
Actual size of this chart is 3½ x 25½ inches . . . on which is also shown the exact time of day each foot is drilled; also the down time
Reasonable rental rates . . . Write for details
"TIME WILL TELL"
THE GEOLOGRAPH CO.
25 North Western
Oklahoma City 4, Oklahoma



HEAVY DUTY JOB?

Put it up to an

FWD

Servicing fifty-two drilling rigs that are "makin' hole" day and night in the vast Rangely Oil Field in Colorado, means a heap of heavy hauling. Twenty-four hours a day, men and trucks are on call.

Wherever there's a heavy-duty job in oil field operations, depend on FWD four-wheel-drive and six-wheel-drive trucks to get more work done . . . fast, safely, at low cost. For more information about these rugged FWDs, see your nearest FWD distributor, or write to . . .

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory. KITCHENER, ONTARIO

FWD

America's Foremost Heavy-Duty Truck

The M6 x 6 FWD trucks pictured here are hauling bulk cement to location — heavy loads, on long hauls, over difficult terrain.

vance in California crude prices has further stimulated heavy oil development in the shallow Tar Zone in the town lot area of the Huntington Beach field. Latest company to announce drilling plans is Pacific Western Oil Corporation, which has located Turner Fee 1 175 feet southeast of the intersection of 21st and Palm Streets.

Santa Barbara County: Signal Oil and Gas Company has purchased all of the A. N. MacCrate & Sons properties in the Santa Maria Valley field. The deal involves 14 wells which last year produced an aggregate of about 500 barrels daily.

San Luis Obispo County: Union Oil Company has located Mary C. Phelan 1, third wildcat on its big Nipomo Ranch lease. The previous 2 tests were failures.

• Illinois Basin

Marion County, Ill., Wildcat Sets Pipe After Testing Oil

Xenia pool area wildcat, Marion County, Ill., sets pipe after testing oil; East Herald and Clay City pools get new pays.

Illinois

J. H. Gilliam's Ebe 1, NE NE NW 14-2n-4e, Marion County, 4 miles southwest of the Xenia pool, has set pipe for tests of McClosky lime at 2874-78 and 2753-61 feet. During a drill-stem test of the upper pay the well gassed in 11 minutes and flowed oil in 1 hour and 40 minutes.

Ben Taylor's Sebastian 1, NW NE SW 21-1n-2e, a semi-wildcat in the Salem pool area, has pipe set for tests of Bethel sand at 1920-27 feet after 185 feet of oil was recovered on a drill-stem test.

Gallatin County: Joe Reznik's Glover 1, NE NE NW 24-7s-9e, is giving the East Herald pool a new horizon. After a 40-quart shot in the Aux Vases sand the well flowed 150 barrels of oil in 24 hours. Testing continues.

Wayne County: W. R. Tully's Huber 1, NE SW SW 17-1s-8e, a south offset to an Aux Vases producer which extended the Clay City pool a mile, is giving the area a new pay zone. During a 1-hour drill-stem test, the well yielded 2700 feet of oil from O'Hara lime at 3194-202 feet.

Wabash County: Lyle Dieterle's Stilwell 1, NW SW SW 8-1n-11w, a new wildcat operation, is drilling below surface casing. Joe Reznik's Newkirk 1, SE NW SW 28-1n-13w, a wildcat, is abandoned as dry at 2744 feet.

Edwards County: Dean Smith's Smith 1, SE SE NE 25-1s-10e, is drilling below 3150 feet in wildcat territory.

Indiana

Princeton Mining Company's McCarty 1, SE NW NE 13-2s-1w, Gibson County, 1½ miles southwest of the North Princeton pool, swabbed 40 barrels of oil in 10 hours from McClosky lime at 2137-47 feet after treatment with 2000 gallons of acid.

• Michigan

East Norwich Area Test Logs Oil and Gas Show in Monroe

East Norwich area test heads for Richfield after yielding show in Monroe; Stony Lake field failure likely; Gratiot County wildcat has gas in Michigan Stray at 988 feet.

Roscommon County: The Pure Oil Company's State-Beaver 1, W½ SW NW 17-25n-4w, 6 miles northeast of East Norwich oil field, carried a show of oil and gas in the Monroe at 4020-35 feet. Drilling proceeded to test the Richfield section, chief producer in the East Norwich area.

Oceana County: The Carter Oil Company's Miller 2, NE NE SW 11-13n-18w, northeast side of the Stony Lake field, recovered a negligible amount of oil after acid in the Traverse at 1647 feet and may prove the first failure for the field. The same company's Schiller 2, NE SE SW 10-13n-18w, west side of the field, projected Monroe test, carried a light show of gas in Dundee section at 2117-26 feet.

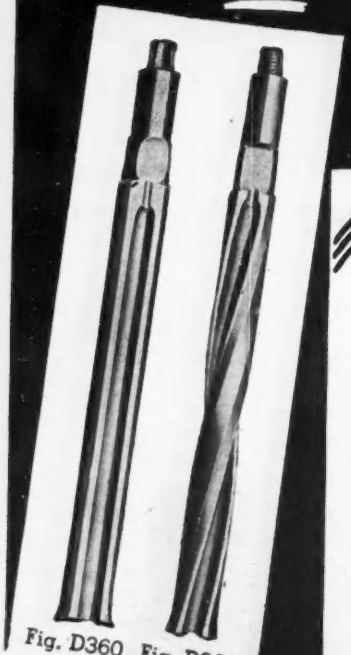
Gratiot County: Muskegon Development Company Bauher 1, NE SE SW 24-10n-4w, 3 miles southeast of the old New Haven gas field, logged 400,000 cubic feet of gas in Michigan Stray sand at 988 feet.

• Ohio

Brush Creek Township Test Is Good Gasser in Clinton

Big gas well in Brush Creek; Sayre has gas extension; St. Peter test in Deerfield is failure; Logan County test reaches granite.

Muskingum County: John Morrow et



SPANG HEAT-TREATED DRILLING BITS

Spang Drilling Bits are forged by a patented process which assures a sound, homogeneous product. The steel is made to specifications, which have been developed out of a long experience, to give the maximum of footage per dressing.

In the heating and forging operations, the most modern methods are used. Each step is carefully planned and executed to produce sound forgings. Heat treatment by use of modern furnaces with heat-recording instruments and experienced personnel insures the maximum of joint strength. A field dressing instruction chart is yours for the asking.

Spang Drilling Bits reflect the skill and knowledge that make every Spang Cable Tool a "Higher Standard" product.

THE HIGHER STANDARD

SPANG & CO.
BUTLER, PA.

YOUR DEALER SELLS SPANG TOOLS

WANTED TO BUY

DRILL PIPE WANTED. Submit us what you have—any size and in any condition. Will pay fair price for any lot, including pipe not fit to run, and even junk pipe. The Clay Brothers Drilling Company, Inc., 1804 Fair Building, Fort Worth 2, Texas.

Is Your Company For Sale?

Wanted to buy small local manufacturing company which supplies equipment to petroleum industry. Desirable that company's products and manufacturing ability are already proved. Buyer not interested in inventions or new developments not in production. Write us giving type of product you manufacture, plant size and general location and approximate asking price. Box 74, c/o World Oil, Houston, Texas.

LEASES, DRILLING, ACREAGE, ETC.

SEE A. L. BOWLES, ADA, OKLAHOMA. FOR SHALLOW DRILLING DEALS IN OKLAHOMA.

INVESTMENTS

If you have a million dollars or more which is not helping to secure the future of these United States, and which is not earning a reasonable return, and if you still have faith in our country, and do not always believe that it is headed for the rocks, in short that you are not a prophet of "DOOM," get in touch with us at 731 Public Ledger Bldg., Philadelphia 6, Pa., we possibly could do business together.

MAPS

PERMIAN BASIN EXECUTIVES MAP
1947 EDITION
Shows sections, surveys, wells, dry holes, and depths in clue; field names, formation, depth, discovery year, number wells in red; larger lease blocks, expiration year in green. 1-in. —5 mi. 3 x 4 ft. Illustrated folder on request.
PRICE $7.50
SOUTHWEST MAPPING COMPANY
1101 Ft. Worth Nat'l Bldg.,
Ft. Worth, Texas

READ
The Trading Post
FOR SALES
AND SERVICES

al moved in among four dry holes in the northeast part of Brush Creek Township, and struck a big gas well on the Phoebe R. Seyerle tract in SE SW Sect. 19. Top of the Clinton was reached at 4090 feet and drilled to 4112 feet, where the well showed an open flow of 2,050,000 cubic feet of gas.

Perry County: Another gas well in the Sayre pool was brought in by Ohio Fuel Gas Company on Scott Higgins, SW SW 15 Bearfield. Clinton sand at 3801-43 feet was broken and dry. The Medina sand at 3894 feet was drilled 5 feet in where it showed 800,000 cubic feet of gas natural.

Morgan County: The deep test on Maynard Barnes in Deerfield Township by S. J. Brendel Oil and Gas, Inc., was completed as a dry hole. Trenton limestone at 5720-6464 feet had no showings and the St. Peter sand at 6600 feet was making water at 6644 feet. Drilling was stopped there and the well plugged.

Logan County: The Ohio Oil Company's test in McArthur Township reached the granite from 500 to 1000 feet above the various estimates made. The well was drilled as a tight hole but available information showed the top of the granite at 3320 feet under a cover of about 40 feet of weathered wash. The well was continued down to 3361 feet and then plugged.

• Rocky Mountain Area

Seven Mile Dome, Wyoming, Wildcat Cores for Sundance

Seven Mile Dome, Wyoming, wildcat cores for objective Sundance; Quealy Dome test may make better well than discovery; location made for Little Buck Creek field extension try; Northwest Elk Basin, Montana, test tries for Madison production; Moffat County, Colorado, wildcat makes good progress.

Wyoming

The only wildcat operation in southeastern Wyoming is now coring for the objective Sundance sand below 6370 feet. The well is The California Company and Phillip Petroleum Company's Christiana 1, NE NE SE 8-17n-77w, on Seven Mile Dome, Albany County, 5 miles northwest of the Quealy field. Sundance is expected within the next few feet. The well had oil in the Muddy on test at 5821-5833 feet 3 weeks ago, and has had small shows of oil in the Dakota and Lakota but made water on test of these sands. No plans have been announced for a Tensleep test at this well, but inasmuch as Tensleep is productive at Quealy, this horizon may be tested if the Sundance is not productive.

California's second Tensleep test at Wilson 5, CWL SW 18-17n-76w, Quealy Dome, probably will be a better producer than the discovery, ½ mile west. The well topped the Tensleep at 5318 feet, more than 150 feet higher than the discovery well completed in January for 275 barrels of oil daily. The wells is at 5592 feet, total depth, and recovered 60 feet of mud and water on drill-stem test of the lower section at 5530-92 feet. No test was reported of the upper section of the formation but good saturation showed in samples and cores.

Niobrara County: South of the Little Buck Creek field, A. B. Cobb of Great Falls, Mont., and others have made location for an extension test a mile southwest of production. The well is Maguire 1, NE NW SW 35-36n-64w, and will go to the Dakota sand at around 3800 feet. The Little Buck Creek field proper is controlled by Continental Oil Company and is now producing approximately 1000 barrels of oil daily from 12 wells in the Dakota.

Sweetwater County: The Texas Company's third well on the Table Rock structure does not appear to be much of a producer from the lenticular Tertiary sands. The well is Unit 3, CEL NW SE 2-18n-98w, a mile southwest of the discovery which was completed last year for approximately 5 million cubic feet of gas daily. The well is at 3950 feet, total depth, and on drill-stem test at 3797-889 feet produced at the rate of only 750,000 cubic feet of gas daily. A second test at 3850-86 feet showed 800,000 cubic feet. The second test on this structure, a mile northwest of the discovery, was a dry hole after failing to find the sand productive at the discovery.

Montana

Possibility of Madison oil production on the Northwest Elk Basin structure is now being tested by Sinclair Wyoming Oil Company at Wilkins 1, NW SW NW 28-9s-23e, Carbon County. The well topped the Madison at 6225 feet and found some saturation in the lime formation. A drill-stem test was being made at 6380 feet, total depth. This test topped Tensleep at 5912 feet 2 weeks ago and tested more than 5 million cubic feet of sour gas in that section. The well found saturation in the Frontier formation and 315 feet of oil was recovered on drill-stem test at 3425-76 feet. In the Dakota, topped at 4382 feet, the well made 3,212,000 cubic feet of sweet gas in 40 minutes.

Colorado

The wildcat being drilled by Cities Service Oil Company and Transcal Company of California at Government 1, SE SE NW 27-12n-96w, East Powder Wash, Moffat County, is making good progress. The well drilled more than 3000 feet in a week and is now below 3620 feet. No shows have been encountered at present depth. The well is scheduled as a test of Wasatch sands down to 5500 feet Powder Wash field proper, 10 miles west, produces both gas and oil from lenticular Wasatch sands.

Utah

Mountain Fuel Supply Company's deep test of the Clay Basin field at Murphy 6-W, NW SE NW 22-3n-24e, Daggett County, is an evident failure in the Weber sand at 9355 feet, total depth. The well has been plugged back to 5875 feet, probably in the Morrison. Weber has been unofficially reported topped at around 9050 feet, and tests in the formation failed to show production of gas or oil. Mountain Fuel has not released data of formations or tests on the operation.

Carbon County: Another 100 feet remain to be drilled in Pacific Western Oil Company's test of Gordon Creek at Unit 1, C SE NE 24-14s-7e. The well is the deepest ever drilled in the state and is now below 11,007 feet, and running electrical log. Kaibab has been unofficially reported topped at 10,894 feet, and the well is projected as a test of the Coconino, expected within the next 100 feet.

EXPLORATORY FAILURES

ALABAMA WILDCAT

Clarke County: Shell's C. C. Brooks 1, nw ne 11-8n-1e, abnd 7-9-47 at 5002.

ARKANSAS WILDCAT

Ashley County: McAlester Fuel Co.'s Crossett Lbr. D-1, c ne ne 7-16s-6w, abnd 7-5-47 at 3810.

CALIFORNIA WILDCATS

Kern County: Independent Exploration Co.'s Kuhn 81, 15-27s-26e, Premier area, abnd 7-10-47 at 7737.

Fresno County: Robert S. Lytle, Op's 58-34, 34-20s-15e, Coalinga area, abnd 7-10-47 at 8827.

Pacific Western Oil Corp.'s Enmark 1, 5-17s-19e, Riverdale area, abnd 7-7-47 at 8100.

Solano County: Shell's Szekeres 1, 19-8n-1e, Winters area, abnd 7-9-47 at 5118.

Ventura County: M. T. Grubb, Op.'s Snowball 1, 10-4n-24w, Snowball Mt. area, abnd 7-4-47 at 6416.

ILLINOIS WILDCATS

Clay County: J. W. Rudy's McElyes 1, se se ne 1-3n-5e, abnd 3010.

Effingham County: Gulf's Siegmann 1, ne ne ne 4-6n-4e, abnd 2422.

Fayette County: A. J. Hammer et al's Sells 1, sw ne ne 13-6n-2e, abnd 1858.

Gallatin County: C. E. Brehm's Bruce 1, nw se sw 29-7s-8e, abnd 2965.

J. H. Gilliam et al's Orr 1, ne ne nw 28-7s-10e, abnd 2972.

Shelby County: Homer Luttrell et al's Gallagher 1, nw nw sw 27-10n-4e, abnd 2010.

Wayne County: Kingwood Oil Co.'s Melton 1, se sw se 20-1n-5e, abnd 3068.

INDIANA WILDCAT

Gibson County: F. W. George et al's Blood 1, nw nw ne 22-3e-13w, abnd 2870.

KENTUCKY WILDCAT

Butler County: Frank Bernier's Craig 1, 15-I-132, abnd 1235.

KANSAS WILDCATS

Butler County: J. M. Huber Corp. et al's Strait 1, se sw se 28-26s-6e, abnd 3213.

Edwards County: Skelly's Martin 1, nw sw nw 8-26s-16w, abnd 4495.

Ellsworth County: Bridgeport Oil Co.'s Janda 1-G, c n½ nw nw 28-15s-10w, abnd 3350.

Graham County: Anderson Prichard Oil Corp. et al's Klewer 1, sw sw sw 24-10s-21w, abnd 3870.

Reno County: Braden-Greene Drlg. Co.'s Goetzer 1, sw sw sw 12-22s-5w, abnd 3991.

Rooks County: Nate Appleman's Mathews, nw nw sw 29-7s-19w, abnd 3471.

Rush County: Stanolind's Budde 1, se se nw 2-19s-16w, abnd 3663.

Wilson County: Mid-Continent's Eshbaugh 1, nw ne nw 12-27s-13e, abnd 1866.

NORTH LOUISIANA WILDCATS

Bienville Parish: Nelson Bunker-Hunt Tr's Nebo Oil Co. 1, c se nw 33-16n-7w, abnd 7-3-47 at 8250.

Bossier Parish: C. W. Beene's Muslow 1, ne sw 13-21n-14w, abnd 6-18-47 at 1105.

De Soto Parish: Texas Co.'s J. B. Abington 1, 3165 fr sl 3585 fr el 18-13n-14w, core test, abnd 7-10-47 at 1580.

Texas Co.'s Mrs. A. E. Huhn et al 1, 875 fr sl 143 fr el 19-13n-14w, core test, abnd 7-9-47 at 1560.

Texas Co.'s J. B. Gamble et al 1, 290 n 75 e of c 25-13n-15w, core test, Grand Cane prospect, abnd 7-7-47 at 1600.

Texas Co.'s J. M. Ford 1, 189 fr sl 92 fr wl se 30-13n-14w, core test Grand Cane Prospect, abnd 7-8-47 at 1584.

Franklin Parish: C. H. Murphy, Jr.-Sun's West Virginia 1, se se 32-16n-8e, abnd 7-9-47 at 4243.

Grant Parish: Texas Co.'s J. T. Dewitt 1, ne 8-7n-1w, abnd 6-10-47 at 1455.

Texas Co.'s J. W. Smith 1, nw 19-7n-1w, abnd 6-4-47 at 1450.

Texas Co.'s J. T. Boyt 1, 85 fr sl 250 fr wl 34-7n-1w, abnd 6-7-47 at 1465.

Union Parish: W. L. Stokes' Futch, 1, se sw 9-22n-1w, abnd 6-28-47 at 2258.

M. E. Roberts-T. L. Benson-A. D. Roberts-L. E. Roberts' Mrs. A. R. Luzades 1, c se se se 10-22n-1w, abnd 7-6-47 at 2228.

T. L. James & Co.'s E. H. Miller 1, 1005 fr sl 3453 fr wl 36-23n-2w, abnd 6-25-47 at 6923.

C. W. Sharp-J. E. Kemp's Zollie C. Rabun Est. 1, e nwc 28-21n-1w, abnd 7-11-47 at 2543.

Joe C. Lesage's P. P. Price Est. 1, nw 32-22n-1w, 1st Nacatoch 2079, 2nd Nacatoch 2130, Nacatoch 2153, abnd 7-8-47 at 2196.

Paul E. Parsons et al's Gordon Taylor 1, c sw nw se 34-22n-1e, abnd 7-15-47 at 3169.

Vernon Parish: Humble's Anderson-Post Hardwood Lbr. et al 1, 1889 fr el 1450 fr sl 11-2n-11w, abnd 7-8-47 at 12,159.

SOUTH LOUISIANA WILDCATS

Plaquemines Parish: Texas Co.'s Bradish-Johnson Co. 1, 19-18s-26e, 4 mi e of Lke Hermitage fld, abnd 3-20-47 at 13,560.

St. Charles Parish: Gulf's Delta Sec. Co. 23, sec 8-15s-22e, Bayou Couba area, abnd 7-9-47 at 11,625.

St. Mary Parish: Magnolia's State Lse 684, Blk 94-1, 4493 fr nl 7448 fr wl blk 94, 23 mi s sw Rabbit Island fld, abnd 7-9-47 at 2613.

MICHIGAN WILDCAT

Bay County: Chapman Oil Co.'s Eigner 1, ne ne ne 20-16n-3e, abnd 7-12-47 at 2058.

MISSISSIPPI WILDCATS

Chickasaw County: Davidor & Davidor's H. B. Carter 1, (owdd) nwc se sw 24-12s-4e, Eutaw 520, Tuscaloosa 748, Mississippian 2340 abnd 7-6-47 at 3046.

Marion County: Humble's Ernest R. Ford 1, Sec 20-1n-17w, Wilcox 3006, Eutaw 7840, L. Tuscaloosa 8893, Massive sd 9200, abnd 7-7-47 at 9650.

Washington County: C. H. Murphy Jr.-Sun's E. J. Ganier 1, se nw 30-15n-6w, abnd 7-5-47 at 4466.

C. H. Murphy's W. B. Swain 1, sw sw 29-15n-5w, abnd 7-7-47 at 4312.

Yazoo County: Carter's Medie Morgan 1, sw ne 9-12n-3w, Eutaw 5717, Tuscaloosa 6321, Comanchean 7022 abnd 7-9-47 at 7055.

NEW MEXICO WILDCATS

Curry County: H. W. Snowden O&G Co.'s Skarda-Daugherty 1, c se nw 20-5n-35e, elev 4554, lime 2685, San Andres 2900, abnd 7-2-47 at 3590.

Lea County: Amerada's State 1-S-L-A, c se se 24-21s-33e, elev 3751, anhydrite 1880, base salt 3735, Yates 3950, abnd 7-6-47 at 6370.

NEW MEXICO NEW PAY TEST

Eddy County—Grayburg-Jackson: Grayburg Oil Co. et al's Keeley 10-A, c nw ne 24-17s-29e, elev 3609, Red sand 1918, Grayburg 2314, San Andres 2650, Glorietta 4065-4150, Yeso 4186, Drinkard 5542, Abo 6240, abnd 7-9-47 at 6866.

OHIO WILDCAT

Morgan County: S. J. Brendel O&G's 1 Maynard Barnes, sw ne 12 Deerfield, St. Peter 6600, abnd 7-1-47 at 6644.

OKLAHOMA WILDCATS

Alfalfa County: Gutowsky Bros et al's Pelter 1, c ne se 21-25n-12w, abnd 2738.

Caddo County: Grayhill Drlg. Co.'s Wetselline 2, sw ne ne 34-6n-12w, abnd 4312.

Cotton County: L. H. Choate's Bost 1, c nw nw nw 23-3s-10w, abnd 2495.

J. Ben Russell's Flatcher 1, nw nw ne 11-3s-11w, abnd 2111.

Snoddy Brothers' Allgood 1, ne ne se 16-3s-12w, abnd 2020.

Winfrey Brothers' Pen-ner-or-ivo 1, nw sw se 24-3s-12w, abnd 1664.

Cochran & Cain's Jones 1, ne ne ne 15-4s-10w, abnd 1355.

F. E. Webb et al's Wilson 2, nw ne sw 8-4s-11w, abnd 1661.

Morgan Bros. Rose 2, nw nw ne 25-4s-11w, abnd 1505.

Nixon Pet. Co.'s Manz 1, ne se sw 35-4s-12w, abnd 1883.

Garvin County: Tom Potter et al's Bonner 1, sw sw 16-2n-1w, abnd 6502.

Hughes County: Mid-Continent's Badger 1, sw sw sw 1-6n-8e, abnd 3840.

Jefferson County: Ernest Shamblin's Folsom 1, ne ne nw 34-3s-4w, abnd 3956.

McCurtain County: R. M. Edwards' Perry 1-A, se sw se 25-7s-26e, abnd 1405.

Pontotoc County: Kenneth Nix's West 1, sw sw ne 17-5n-7e, abnd 2470.

Seminole County: A. Ben Caldwell's Kaney 1-A, se sw nw 19-8n-7e, abnd 3350.

NORTH TEXAS WILDCATS

Archer County: Perry Browning et al's Kehmier 1, 450 out swc sw¼ T. P. Martin sur, abnd 7-5-47 at 2333.

A. R. Dillard et al's Dycus 1, 1537 snl 330 ewl sect 1894, TE&L Co. sur, elev 1037, abnd 7-8-47 at 4208.

E. P. Bowen et al's Turbeville 1, 1450 nsl 1050 ewl blk 36, Harris sbdn, abnd 6-18-47 at 1463.

Mayflower Properties Kinder 1, 2310 nsl 450 wel sect 44, blk 5, Clark & Plumb sur, abnd 6-23-47 at 1236.

Swan Reeves et al's Turbeville 1, 1607 wel 2770 snl R. R. Rainey sur, abnd 4-6-47 at 1063.

Republic Gas Co.'s Lemmons 1, 1200 nsl 450 ewl blk 3, Wm. Ainsworth sur, abnd 6-12-47 at 1355.

Montague County: A. R. Dillard's Houpf 1, 467 out swc of 93-ac lse, or 467 ewl 950 nsl N. B. Zumwall sur, elev 972, Bend 5498, conglomerate 5671-79, abnd 7-7-47 at 6008.

Wichita County: Frank Wood et al's Singletary 1, 941 nsl 1224 ewl C. T. Ry. sur, abnd 7-1-47 at 1602.

EAST CENTRAL TEXAS WILDCATS

Fannin County: McCurdy Bros. et al's Springfield 1, 3650 wel 2500 snl Wm. Onstet sur, elev 571, abnd 7-5-47 at 2822.

Leon County: Carter-Gragg Oil Co.'s Carter 1 525 fr m/s/sel/5 fr m/s/swl of C. C. Goodman sur, elev 324, Pecan chalk 4023, Austin 5132-5450, Sub-Clarksville 5502-10, Woodbine 5760, abnd 7-4-47 at 5873.

NORTHEAST TEXAS WILDCATS

Panola County: Chicago Corp. et al's Evie McDaniel 1, E. Lewis Survey, on Ohio Farmout, Massive Anhydrite 5305, base James 6121, Travis Peak 6607, abnd 7-7-47 at 6949.

Titus County: W. M. Coats et al's Lackey 1, 1050 wel 3500 fr m/n/nl of Jos Leach sur, elev 427, Pecan chalk 2000-2640, Sub-Clarksville 3360, Woodbine 3818, Goodland 5220, Paluxy 5304, abnd 7-8-47 at 5493.

SOUTH CENTRAL TEXAS WILDCATS

Atascosa County: Southern Minerals Corp.'s Rosena Campbell 1, 1400 fr ne&nwl Moses Hesskew sur 198, abnd 7-1-47 at 5900.

Caldwell County: Bruce Albright's Ewald Bros. 1, 3200 fr sel Rhos. Maxwell sur, 450 fr sw&nwl 67-ac lse, Austin ch 896, abnd 6-11-47 at 906.

SOUTHWEST TEXAS WILDCATS

Duval County: Taylor Ref. Co.'s E. A. Parr 1-H, 467 e of wl sur 113, 1¼ mi ne Agua Prieta fld, abnd 6-14-47 at 4840.

Hidalgo County: Royal O&G Corp's W. R. Jackson 1, 467 fr n&el 689.1-ac lse, sh 3-A, Porc 41, abnd 7-2-47 at 5010.

Kenedy County: Humble's John G. Kenedy 1-B, c 40-ac lot 2, blk 21, El. Pastile Gr, abnd 7-5-47 at 8439.

San Patricio County: Bridwell Oil Co.'s M. T. Beall 1, 9200 fr nwl 8100 fr sly/nel M. P. & J. N. Delgado Gr, abnd 7-2-47 at 5217.

Seaboard of Del.'s A. A. Smith 1, 767 fr wl 12 fr sl John W. Paup sur, abnd 5-10-47 at 9222.

Southern Minerals Corp.'s J. H. Johnson 1, sw¼ sect 35, Geo. H. Paul sbdn Welder Rch, abnd 7-5-47 at 6516.

Starr County: Humble's 1800 sw alg nwl TTRR Sur 373, 640-ac lse, abnd 7-1-47 at 5220.

Zapata County: Government Wells Oil Co.'s Virginia Garcia 2, 2970 fr nwl 8300 fr nel Edwards sbdn, 10 mi w of Blas Uribe fld, J. V. Borrego Gr, abnd 6-12-47 at 945.

J. L. Hatcher's Anastacio Garcia 1, 600 fr sel 504½ fr nel 815½ fr swl tr 17, 1134-ac lse, sh "B" Charco Redondo Gr, abnd 6-1-47 at 991.

A. M. Lacey's Salome Martinez de Flores 1, 30 fr ne&nwl blk 4, 330 fr nel 962.7-ac lse, Blas Maria Gr, abnd 6-1-47 at 2825.

MIDDLE TEXAS COAST WILDCAT

Bee County: Magnolia's W. E. Erp 2, 1320 fr swl 2300 fr sel N. Recendes Gr, Plummer-Wilcox area, abnd 7-3-47 at 3350.

UPPER TEXAS COAST WILDCATS

Chambers County: Texas Co.'s Kirby Pet. Co. NCT 2-1, 1320 fr sel 330 fr nel sect 1 T&NO Sur and 330-ac lse, abnd 7-6-47 at 10,477.

Ft. Bend County: Texas Gulf Prod. Co.'s J. F. Winston 1, start nec Randall Jones sur, go 2423 w alg nl th s at ra 6916 to lcn, abnd 7-7-47 at 7824.

Galveston County: Sam E. Wilson, Jr.'s Walter S. Davis 1-A, 150 fr s&wl lot 48, Miguel Muldoon sur, abnd 6-24-47 at 10,050.

Walker County: Trull & Thompson's W. B. Frazer & Nell F. Campbell, Tr. 1, (OWDD) 330 fr n&wl blk 35, F. W. Baker, Wilson et al sur, 6 mi sw Huntsville, abnd 7-2-47 at 2458.

WYOMING OUTPOST

Washakie County—Hidden Dome: MacKinnie Oil & Drlg.'s Broome 1, sw sw 'sw 30-48n-90w, Embar lime 4863, Tensleep 5100, abnd 5206.

Arkansas Ruling

The Arkansas Oil and Gas Commission, in an order dated July 2, ruled that operators must obtain a permit to shoot, perforate or treat any well in a controlled pool in the state, defined as any field discovered after January 1, 1937. Operators must file a report with the Commission. All perforating jobs on a well penetrating more than one productive zone or a zone believed capable of producing oil or gas must be witnessed by an agent of the Commission. The order further decreed that no well may be produced through more than one set of perforations. In the case of dual completions, a permit must be obtained for each set of perforations.

E. W. Webb

G. T. Pearson

E. W. Webb, formerly general production superintendent at Los Angeles for Continental Oil Company, has been made assistant manager of the Production and Drilling Department, Ponca City, Okla., succeeding **R. W. French,** who recently resigned. Webb is succeeded by **Gerald T. Pearson,** Los Angeles, who has been California's region petroleum engineer since 1946. **M. H. Dubrow,** Fort Worth region petroleum engineer, has been named chief petroleum engineer, Ponca City, a new position in the department, and **S. V. McCollum,** division petroleum engineer at Midland, Texas, succeeds Dubrow as regional petroleum engineer at Fort Worth.

»

Frank R. Seaver, president of Hydril Corporation, has been appointed a member of the Pomona (Calif.) College board of trustees. Seaver is a Pomona graduate, class of 1905. Seaver last fall donated funds making possible the acquisition of the complete equipment of the spectrographic laboratory of the former Alcoa war plant at Torrance, Calif., by Pomona College.

»

John H. Kelsey has been named manager of Southern Minerals Corporation's new district land and geological offices at Midland, Texas, effective August 1. The firm recently purchased property in the Midland business district and the building is now being redecorated. Kelsey joined Prairie Oil and Gas Company in 1929. He has been with the Sinclair group for 18 years. Since May, 1946, he has been division land manager at Albuquerque, N. M. **Ellis H. Scobey,** recently with Bay Petroleum Corporation, is district geologist for the Midland area. **Miss Norma Ruth Shepherd** is secretary for the office.

»

Walter D. Baird, who has been with Geophysical Service, Inc., for 13 years, has joined South Geophysical Company in Fort Worth with offices in the Sinclair Building. Baird will work in a supervisory capacity with the Southern staff. He is a graduate engineer from the University of Arkansas and his experience in geophysical work includes all oil provinces in the U. S. and considerable foreign work in Colombia.

»

Sam E. Wilson, Jr., Corpus Christi independent oil man, was named chairman of the 1948 Buccaneer Days celebration at a special meeting of 300 business and professional men recently.

Gordon R. Kay, vice president of Bay Petroleum Corporation and Chalmette Petroleum Corporation, has been elected president, succeeding **Roland V. Rodman,** who has been named president of Anderson-Prichard Oil Corporation. **Charles Ulrick Bay,** presently on leave of absence as U. S. ambassador to Norway, will remain as chairman of the board. Kay has been associated with Bay for 15 years. The new president appointed a management committee consisting of the following executives, who were elected vice presidents: **B. W. Bee,** vice president, chief geologist and exploration engineer; **H. I. Craig,** vice president and general production superintendent; **Charles O. Garbrecht,** vice president and superintendent of manufacture; **Leo L. Leabo,** vice president and director of sales; and **Dent. N. Hand,** secretary-treasurer and comptroller.

»

Everett L. Meley has been named superintendent of storage and delivery facilities for Sun Oil Company throughout the Southwest. Meley joined the engineering department for Sun's Dallas office in 1919 and six months later was assigned to the purchasing department of the Beaumont office. In 1920 he was transferred to Sun Pipe Line Company as assistant pipe line superintendent. He became pipe line superintendent of the Gulf Coast Division in 1944.

»

W. K. Daggett has been made division sales manager for the Eastman Oil Well Survey Corporation of Denver and will headquarter at Dallas. Daggett formerly was Rocky Mountain representative for Lane-Wells Company.

»

Harvey W. Lee, Union Oil Company, geologist, has been appointed general chairman for the 24th annual meeting of the Pacific Section, AAPG Nov. 6-7 at the Huntington Hotel in Pasadena. **James C. Kimble** has been named program chairman and **Robert T. White,** program subchairman.

»

Walter Heathman has been made manager of Union Oil Company's oil operations in Washington with headquarters at Olympia.

J. M. Evans has been named chief engineer and chairman of the board of engineers for Standard Oil Company of California. Evans, assistant chief engineer since 1944, succeeds **H. H. Hall,** now a director and vice president of Trans-Arabian Pipe Line Company. Hall also continues with Standard as consulting engineer.

J. M. Evans

Evans began with Standard of California in 1915, on graduation from the University of California. After service in World War I, he returned to the company's engineering department in 1920, and since that time has been associated with Standard's engineering and construction work. From 1929 to 1939 he headed the civil engineering division of Standard's Engineering Department and in 1943 he was made assistant to the chief engineer. **R. W. Parker** and **E. S. Warner** become assistant chief engineers and **A. W. Horton** is made assistant to the chief engineer.

»

Clint W. Murchison, vice president of the American Liberty Oil Company, Dallas, will finance through a gift to Texas A. & M. College Development Fund the four-year college course of ten Texas high school graduates to be selected by college officials on a statewide competitive basis.

»

H. F. (Tax) King, Continental Oil Company scout at Oklahoma City, has been transferred to the California Division, with headquarters in the Edison Building, Los Angeles. King is a former president of the National Oil Scouts and Landmen's Association, and recently organized the Oklahoma City Landmen's Association, a bi-monthly luncheon club.

»

Gordon Jacober, formerly a member of Standard Oil Company of California's geological staff in the San Joaquin Valley, has been appointed associate professor of geology at the University of Nevada.

CURTIN CENTRIFUGES

Give You Quick, Accurate Results
With Less Effort . . . at Less Cost

Simple in design, ruggedly built for heavy duty service. Gear ratio and throw of crank produce required speed with no strain. Heads and cranks of 100 CC and 15 CC machines are interchangeable. Meets A.S.T.M. *Standard Method D-96 and A.P.I. Code No. 25 requirements.* Ask for full details.

W·H·CURTIN & CO.
DEP'T "C"
HOUSTON, TEXAS . . . NEW ORLEANS, LA.

Hugh C. Tett has been elected to succeed **G. H. Coxon** of Anglo-Iranian Oil Company as chairman of the council of the Institute of Petroleum, London. Tett previously was chairman of the research committee. He recently was made managing director of Esso Development Company.

Elmer Weis, vice president of Pacific Pumps, Los Angeles, has completed a survey throughout South America and Europe.

R. M. Bolieau has been named California representative for Rector Well Equipment Company, with headquarters in Tulsa. Bolieau entered the oil business in 1928 with Axelson Machine Company and for the past 19 years had been Mid-Continent and Rocky Mountain representative for the D & B Division of Emsco Derrick and Equipment Company.

L. L. Ballew, formerly of The Continental Supply Company's Seminole, Okla., store, has been made manager of the Pratt, Kansas, store, succeeding **A. M. Rouse.** The latter has been transferred to Ellinwood, Kansas, as manager succeeding **D. L. Smith,** who now serves in the capacity of city salesman in Wichita, Kansas.

Joe A. Lyne, former chief field engineer for The Parkersburg Rig and Reel Company, has been appointed Houston plant manager, succeeding the late G. E. Dake. Lyne has been a member of the Parkersburg organization for 23 years. In his previous assignment as chief field engineer, he spent considerable time in foreign as well as domestic fields. He has recently returned from a five months tour of Middle Eastern oil operations.

Joe A. Lyne

Roe Gray, formerly with General Petroleum Corporation, and more recently with Socony-Vacuum Oil Company in Venezuela, was a recent California visitor. Gray is returning to South America as an economic advisor to the Venezuelan government "on loan" from Socony.

Edward R. Valentine, vice president of Fullerton Oil Company, has been appointed general chairman of the Community Chest for the Los Angeles area.

J. E. Miller has been named advertising and sales promotion manager of the associated tire and accessory lines division of B. F. Goodrich Company.

Deaths

A. H. Hover, geologist whose home was in Laguna Beach Calif., was killed by persons unknown in the Ovett section of Jones County, Mississippi.

Fred Cotton, 55, Tulsa oil producer and broker, died in Seminole, Okla., July 11. He had engaged in the oil business since 1924 and moved to Tulsa in 1926.

William Presley Tucker, 74, retired Tulsa oil drilling contractor, died in Tulsa July 11. A native of Doniphon, Mo., Tucker moved to Oklahoma about the time of statehood. He was a member of the old Tucker and Spangler Drilling Company.

Seymour G. Lockwood, 84, Tulsa, retired oil operator, died in Tulsa July 16. A native of Colden, N. Y., Lockwood moved to Tulsa in 1913 from Pittsburgh.

William Wirt King, Jr., 47, attorney for Sinclair Oil Company, died in Chicago July 15. He was a cousin of **Harry F. Sinclair.**

Hervey A. Haltiwanger, 58, manager of the land and lease department of the Derby Oil Company, died in Wichita, Kansas, July 15. He was chairman of the nomenclature committee of the Mid-Continent Oil & Gas Association.

William L. Maxson, 49, inventor and president of the New York Engineering & Manufacturing Corporation which bears his name, died in Boston July 14. Among his inventions was a computing gasoline pump.

Laten Stanberry, former Chief Supervisor of Oil and Gas for the Texas Railroad Commission, died at his home in Austin July 6. A sudden heart attack was assigned as the cause of his death. Stanberry was widely known in the Texas oil industry because of his constant association with it since 1919, when he became the first employe of the Oil and Gas Division, which had just been created. He served in numerous capacities until 1934, when he was Chief Supervisor of Oil and Gas.

I. J. Underwood, 55, Tulsa oil and gas attorney, died at West Point, N. Y., July 10. He had been in New York on business for Warren Petroleum Corporation, Tulsa. He was attorney and general counsel for the Oklahoma Natural Gas Company at the time of his death.

Edward A. Stubler, 67, Tulsa, oil well supply representative, died in Tulsa July 9. A native of Oil City, Penn., Stubler moved to Oklahoma in 1905 and was engaged in the supply business in Bartlesville and Tulsa.

LESS COST PER FOOT

Christensen Diamond Bits Available for the Oil Drilling Industry

Christensen Diamond Bits and Core Barrels in all sizes from 5" up. We have a limited number of core barrels for use with 6" and 6½" bits for rental. We will provide a service man to assist in instructing drilling crews in the use of our equipment.

For complete information on products or service, call or write

LESS COST PER FOOT CHRISTENSEN DIAMOND PRODUCTS

CHRISTENSEN DIAMOND PRODUCTS COMPANY

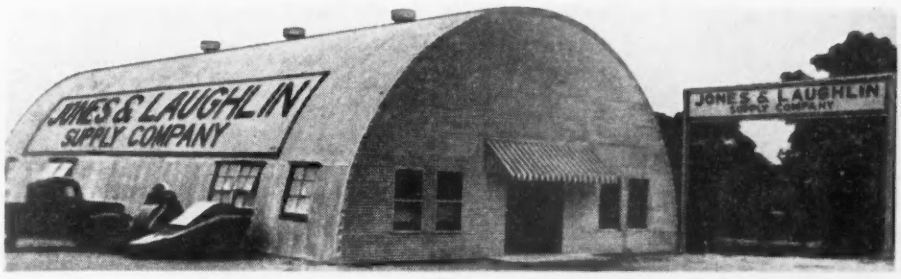
Telephone 6-7838

1975 SOUTH 2nd WEST • SALT LAKE CITY, UTAH

Wyoming and Montana Representative

James E. Emrick P. O. Box 1811, Casper, Wyo.

Jones & Laughlin Opens Store



Jones & Laughlin Supply Company has opened the above store at Brookhaven, Miss. It is the third Jones & Laughlin Supply store in that state.

California Sales Manager, Field Man Named by Patterson-Ballagh

Appointment of C. S. Divelbiss as California sales manager has been announced by Patterson-Ballagh. He assumed his new responsibility following the API Convention at the Yellowstone

C. S. Divelbiss

R. W. Shira

National Park in June. Divelbiss has worked in the oil fields since 1925, and has represented Patterson-Ballagh as a field man in the Los Angeles Basin for the past three years.

R. W. Shira, formerly advertising and sales promotion manager for the firm, will take over Divelbiss' duties in the Los Angeles Basin. From 1938-42, Shira was in the sales department of Hughes Tool Company in California. He left to serve the armed forces in Canada and Alaska, and returned to Hughes in November, 1945. Since June, 1946, he has been handling the advertising of Patterson-Ballagh.

H. L. Hoefman Named Vice President Of Manufacturing for Link-Belt

Harold L. Hoefman has been elected vice president in charge of manufacturing for Link-Belt Company and will have offices at 307 N. Michigan Avenue, Chicago.

Hoefman entered the employ of the firm's Pershing Road plant, Chicago, in 1920 as a draftsman and subsequently held various important positions at Chicago, Kansas City and Dallas. He became district sales manager at Indianapolis in 1932; was appointed manager of the Detroit office and warehouse in 1935; and from 1938 to 1943 was general manager at the company's plant in Atlanta. Since 1943 he has been general manager of the Pershing Road plant.

David E. Davidson has been named general manager of the Pershing Road plant succeeding Hoefman. Davidson has headed the engineering department at the Pershing Road plant since the beginning of the year.

Ralph W. Rausch, assistant chief engineer at the Pershing Road plant, in charge of estimate-engineering since 1933, has been named chief engineer, succeeding C. S. Huntington, who has retired because of ill health.

H. Walter Regensburger, who has been assistant to the vice president in charge of engineering, at executive offices, Chicago, since 1944, has been named divisional engineer in charge of estimate-engineering at the Pershing Road plant.

Eugene P. Berg, who has been assistant to the president since the recent death of E. L. Berry, vice president in charge of production, has been named general superintendent at the Pershing Road plant.

Joseph C. Spence, who has been general superintendent at the Pershing Road plant since 1942, has been appointed assistant to Hoefman.

McAlear Manufacturing Firm Sold To A. J. Smith Engineering Company

The McAlear Manufacturing Company of Tulsa, manufacturers of control equipment for liquids, vapors and gases, and equipment to control pressures, flows and temperatures, has been sold to the A. J. Smith Engineering Company of Kansas City, Mo.

The McAlear plant also manufactures a full line of controls for liquefied petroleum gas systems.

Also purchased by the Smith firm was the Climax Engineering Company of Clinton, Iowa. Both McAlear and Climax were divisions of the General Finance Corporation of Chicago.

The Clinton plant makes a complete line of oil field engines of various types and sizes.

The McAlear Manufacturing Company was known as the Hanlon-Waters Company.

SAFE

Simple-Certain

Increase Boiler Efficiency

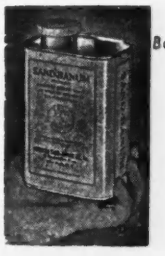
The Sand-Banum Way is so simple—so safe—so certain. One application a week of only a few ounces automatically and safely keeps boilers free of scale and corrosion.

Comes ready to use as is. Needs no special equipment, mixing or expert handling. All active ingredients—saves water analyses—reduces operating and maintenance costs.

Ask For Enough

for a test under your regular operating conditions. If not entirely pleased with results, you will owe us nothing. Guaranteed harmless to personnel and equipment.

Write Today



"The Entirely Different Boiler and Engine Treatment

AMERICAN SAND-BANUM COMPANY, Inc.
9 ROCKEFELLER PLAZA
NEW YORK CITY 20

BETTER Steel Forgings for OIL WELL EQUIPMENT

BEAUMONT WELL WORKS COMPANY

BROOKE TODD, General Manager

INCORPORATED BEAUMONT, TEXAS

Have You Checked The Trading Post?

Turn Back to Page 80

"Red Wheel"
VALVES, HYDRANTS
And Pipe Line Accessories

Write for Catalog No. 34

CHECK VALVE

GATE VALVE

M & H valves are used in the oil industry for water, gas, steam, oil, chemicals and are furnished in all commercial sizes from 2" to 30", inclusive. They are cast iron body, bronze mounted, furnished double disc parallel seat or solid wedge. They are heavily proportioned and have a high factor of safety.

A. W. W. A. HYDRANTS
Underwriters Approved

Conform to American Water Works Association Specifications. Approved and listed by Underwriters' Laboratories and Associated Factory Mutuals. Well known and widely used for many years.

SPECIAL TRAFFIC MODEL is designed to yield at ground line under impact, repair being simply renewal of breakable bolts and breakable coupling on stem. High efficiency because barrel diameter not reduced and there are no working parts or obstructions in waterway.

OTHER M & H PRODUCTS

Fire Hydrants
Gate Valves
Tapping Valves
Special Castings
Tapping Sleeves
Check Valves
Floor Stands
Extension Stems
Mud Valves
Flap Valves
Sludge Shoes

M&H VALVE
AND FITTINGS COMPANY
ANNISTON, ALABAMA

Bethlehem Purchases Tulsa Building

This five-story office building was purchased by Bethlehem Steel Company at Second Street and Boston Avenue, Tulsa. The building houses the Tulsa general office of the Bethlehem Supply Company and the district sales office of the Bethlehem Steel Company.

Du Pont Leases Tulsa Building For Petroleum Fuels Laboratory

The E. I. du Pont de Nemours & Company has leased a two-story brick warehouse in down-town Tulsa for use as a petroleum fuels laboratory. The building will be remodeled to accommodate laboratories on the first floor and offices on the second. The du Pont company now has two offices in Tulsa, an explosives sales agency in the Kennedy building and an industrial sales office.

Joseph Stokes Company, Thermoid Subsidiary, Has New President

L. R. Leaver has been elected president of Joseph Stokes Rubber Company of Welland, Ontario, a subsidiary of Thermoid Company, Trenton, N. J. Leaver had been a vice president and director of the firm.

W. D. Pardoe of Yardley, Penn., was elected a director of the company. Fred Schluter, Thermoid president, continues as chairman of the board of directors, which includes LeAver and L. J. Falkenhahen, also of Welland.

750 Recent College Graduates Employed by General Electric

More than 750 engineers, physicists, and chemists, recent graduates of 150 U. S. Colleges and universities, have been accepted for employment this year by the General Electric Company.

Expansion of the company, coupled with the effects of the war-time shortage of graduates, led this year to selection of nearly twice the normal number of engineers, according to M. M. Boring, assistant to the vice president in charge of engineering policy.

In addition, more than 100 graduates in Business Administration Accounting and Liberal Arts have been selected from colleges and universities for training in accounting and financial work.

The record number of new college-trained employes will enter the General Electric $1 million-a-year education program, Boring said.

Heavy Attendance Expected for Machine Tool Show in Chicago

Attendance at the machine tool show in the Dodge-Chicago plant, Chicago, September 17-26, may exceed the original estimate of 100,000, it was predicted by Swan E. Bergstrom, chairman of the show committee of the National Machine Tool Builders' Association.

Bergstrom said a huge attendance is indicated by the heavy flow of advance registrations being received daily at the association offices in Cleveland.

Aldrich Representative Named

The Aldrich Pump Company of Allentown, Penn., announced that the Petroleum Machinery Company, 30 Rockefeller Plaza, New York, which have represented Aldrich in the petroleum export field, has been appointed industrial representative in the New York area. The marine field will continue to be represented by William O. Mulheron, 11 Broadway, New York.

Continental Opens Store

The Continental Supply Company has opened an office in the Deposit Guaranty Bank Building, Jackson, Miss.

This office is now the headquarters of B. L. Hindman, assistant district manager for the state. Hindman formerly was located at the Brookhaven store.

SQUEAKS from the BULL WHEEL

Largely Untrue

He returned home one night to find his wife weeping. "Oh, John, the doctor said I have tuberculosis and will die in two weeks."

He made a grab for the phone. "Doc, what's this about my wife having tuberculosis and will die in two weeks?"

"I didn't say that. I said she had too big a tokus and will have to diet for two weeks."

This Curious World

Looking over an assortment of perfumes such as "Take Me," "My Sin," and "Heavenly Night," the young girl inquired of the clerk: "Haven't you anything for a beginner?"

It's grounds for divorce when your wife is indifferent—in different men's arms, that is.

A woman never knows what kind of dress she doesn't like until she buys it.

One of these days some strike-happy union will picket a hospital because of labor trouble in the maternity ward.

Many a fellow comes out of his shell when a girl eggs him on.

From a woman's viewpoint, the one thing sadder than a man without a country is a country without a man.

The Woman's Way

"I dreamed last night that I married the most beautiful girl in the world."

"Really? And were we happy together?"

Life Is Like This

Extract from a patent medicine testimonial: "Since taking your tablets regularly I am another woman. Needless to say, my husband is delighted."

Modern Miss

"Did you give our daughter that copy of 'What Every Girl Should Know'?"

"Yes, and she's writing a letter to the author suggesting a couple of dozen corrections and the additions of two new chapters."

Even Trade

A sentry was bitten by a valuable dog and in self defense drove his bayonet into the animal. The owner brought charges.

Judge: "Why didn't you hit the dog with the butt end of your rifle?"

Sentry: "Why didn't the dog bite me with his tail?"

Poet's Nook

It's easy enough to be pleasant
And spend all your time being jolly;
But the man worth while
Is the man who can smile
When his wife finds a letter signed
"Dolly."

Grave Oversight

They wandered alone in the graveyard,
'Till they sighted a mossy old slab.
But later while dancing, he saw on her back;
".baNcM ynneJ fo ydob ehT"

Pardon It, Please

"Where did Dr. Alger make his fortune?"

"On the stork market."

Another One

"Nurse, be sure to put that girl in a private room."

"But, Doctor, we're so crowded."

"Can't help it. She's too pretty for wards."

Can't Miss

Smithers planned a solo jaunt up into the mountains and asked Jake, the grizzled old guide, to check his supplies.

"You gotta map an' a compass?" asked Jake.

"Certainly."

"Hey you gotta deck of playin' cards?"

"Why no. Why do I need them?"

"It mought save your life. If you get lost, just set down and begin playin' a game of solitaire. Next thing you know some fool will pop up behind you and begin telling you what card to play next."

Drawing Her Out

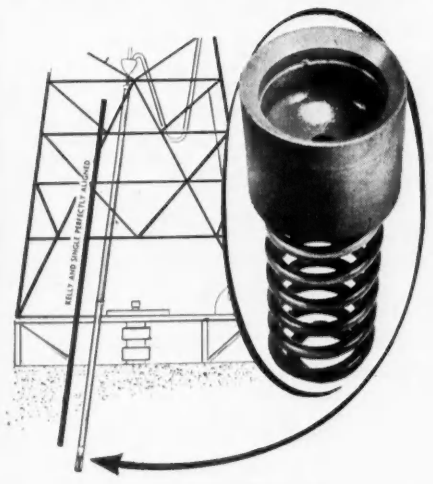
"The artist I pose for does painting, etching and sculpturing."

"But, of course, he does one thing better than anything else?"

"I'll say. But he's pretty good at painting, etching and sculpturing."

RATCLIFF "JOINT AIDS"

REDUCE TOOL JOINT WEAR



Used in the bottom of the mouse-hole, a "Joint Aid" absorbs most of the weight of the Kelly when it is set down on the single in the mouse-hole. Kelly and single are kept in alignment while connection is being made . . . galled threads are eliminated . . . connections are faster and easier . . . you're back on bottom *quicker* with a "Joint Aid" in the mouse-hole.

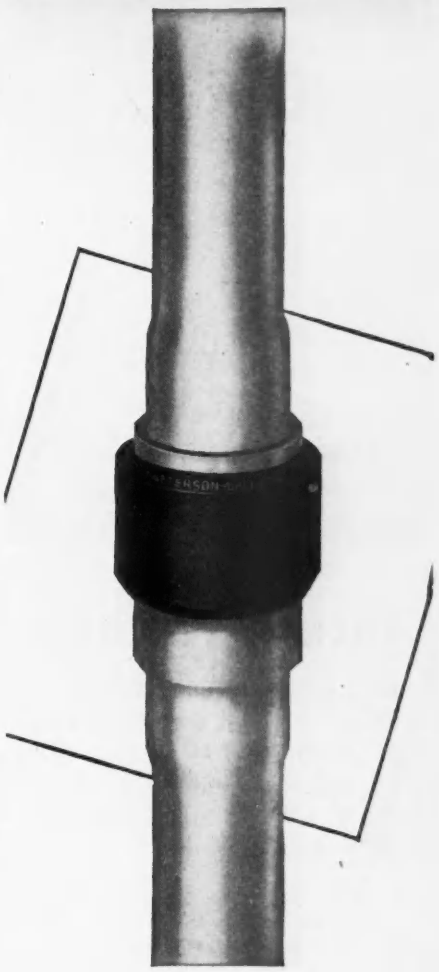
Inquire about them without delay . . . they're made for all popular sizes of pipe and tubing, for any size mouse-hole. Cost? . . . so low that it will be offset by the prevention of just one galled tool joint.

OWEN TOOL COMPANY

Route 9, Box 800-B Telephone V 2-4341

HOUSTON, TEXAS

"Best Bet Yet"



SAVE YOUR TUBING!

Tubing collars worn by contact with casing steal the profit out of pumping. Patterson-Ballagh Plastic Tubing Protectors prevent both collar and casing wear. Oil-proof, wear-resistant, insulating. They are pressed onto the collar under pressure and will not come off. Made in all sizes. End your tubing troubles. CALL in your Patterson-Ballagh man.

Specify

PATTERSON-BALLAGH

A DIVISION OF BYRON JACKSON CO.

"Best Bet Yet"

PLASTIC TUBING PROTECTORS

1900 E. 65th Street, Los Angeles 1
6247 Navigation Boulevard, Houston 11
808 Graybar Building, New York 17
931 Russ Bldg., San Francisco 4

PAGES 3945 THRU 3964 IN THE COMPOSITE CATALOG

TGT Changes Name

Stockholders of the Tennessee Gas and Transmission Company, meeting in the company's main offices in Houston July 15, have approved a management proposal to change the company's state of incorporation from Tennessee to Delaware, and to change the name to Tennessee Gas Transmission Company. (The "and" has been eliminated.)

Advertisers' Index

* The asterisk indicates that detailed information on products and services of the firm will be found in current 15th (1946-47) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

EDITORIAL INDEX, PAGE 21

American Cyanamid Co. ---- 67
*American Roller Bearing Co. ---- 72
*American Sand-Banum Co. ---- 85
*Baash-Ross Tool Co. ---- 65
*Baker Oil Tools, Inc. ---- 24
Wm. M. Barret, Inc. ---- 88
Bates and Glenn ---- 88
Beaumont Well Works Co. ---- 85
The Bovaird Supply Co. ---- 69
*Broderick & Bascom Rope Co. ---- II Cover
*Cameron Iron Works, Inc. ---- 2-3
*Caterpillar Tractor Co. ---- 19
*Chain Belt Co. ---- 41
Chicago Pneumatic Tool Co. ---- 57
Christensen Diamond Products Co. ---- 84
*The Colorado Fuel & Iron Corp. ---- 17
*Continental Motor Corp. ---- 60
The Continental Supply Co. ---- 20
Crowell & Steele, Inc. ---- 88
W. H. Curtin & Co. ---- 83
*E. I. du Pont de Nemours & Co. ---- 7
*Durbin-Durco ---- 88
Empire Trust Co. ---- 68
Ft. Worth Laboratories ---- 88
The Four Wheel Drive Auto Co. ---- 77
*The Garlock Packing Co. ---- 75
The Geolograph Co. ---- 76
*Gray Tool Co. ---- 55
*Great Lakes Steel Corp. ---- 16
Gulf Publishing Co. ---- 4
*Hazard Wire Rope Division American Chain & Cable Co. ---- III Cover
Houston Laboratories ---- 88
*Hughes Tool Co. ---- IV Cover
Industrial Chemicals Division American Cyanamid Co. ---- 67
The International Nickel Co. ---- 79
International Petroleum Exposition ---- 26
Jarecki Manufacturing Co. ---- 46
Jones & Laughlin Steel Corp. ---- 22
Earle M. Jorgensen Co. ---- 13
Keplinger and Wanenmacher ---- 56
*Kobe, Inc. ---- 14-15
*Link-Belt Co. ---- 63
*A. M. Lockett & Co. ---- 76
M & H Valve & Fittings Co. ---- 86
*Marlow Pumps ---- 75
*Miller Sand Pump Co. ---- 56
*Mission Manufacturing Co. ---- 49 and 73
National Bank of Tulsa ---- 59
*The National Supply Co. ---- 8-9
*Oil Well Supply Co. ---- 45
*Otis Pressure Control, Inc. ---- 11
*Owen Tool Co. ---- 87
*The Parkersburg Rig & Reel Co. ---- 53
*Patterson-Ballagh Division Byron Jackson Co. ---- 42 and 87
Pelican Well Tool & Supply Co. ---- 70
*Penberthy Injector Co. ---- 54
Petroleum Electric Power Association ---- 50
*Reed Roller Bit Co. ---- I Cover
Republic National Bank ---- 74
The Robertson Co. ---- 88
Shell Oil Co. ---- 18
*Nowery J. Smith Co. ---- 88
Southern Engine & Pump Co. ---- 66
*Spang & Co. ---- 78
Standard Oil Company of California ---- 10
*Standco Brake Lining Co. ---- 88
The Torrington Co. ---- 12
Trading Post Section ---- 80
United States Steel Corp. ---- 45
Walter Motor Truck Co. ---- 71
*Wheeling Machine Products Co. ---- 88
*Wickwire Spencer Steel Division The Colorado Fuel & Iron Corp. ---- 17
K. R. Wilson ---- 5
*Wilson Manufacturing Co. ---- 1
*Worthington Pump & Machinery Corp. ---- 6

LOAD BINDERS

Drop-Forged • Malleable Iron • Steel

Drop-Forged • Heat Treated • 2 Sizes
Durbin-Boomer F-1—2 swivels, 3/8, 7/16 or 1/2" chain
Durbin-Boomer F-2—2 swivels, 7/16, 1/2 or 5/8" chain

Malleable Iron • Heat Treated • 5 Sizes
MIDGET No. 1—1 swivel, 1/4" chain
DELTA No. 1—1 swivel, 5/16 or 3/8" chain
DIXIE No. 1—2 swivels, 7/16 or 1/2" chain
LONE STAR 1—2 swivels, 7/16, 1/2 or 5/8" chain
LONE STAR 2—2 swivels, 7/16, 1/2 or 5/8" chain

Write for Catalog

DURBIN-DURCO

6611 Olive Street Road • St. Louis 5, Mo

LAND WATER
SEISMOGRAPH SURVEYS
CROWELL & STEELE, Inc.
MODERN 24-CHANNEL EQUIPMENT
OFFICE AND LABORATORY 3812 WEST ALABAMA PHONE HADLEY 2033
MAILING ADDRESS 3416 ELLA LEE LANE PHONE J 2-3986
HOUSTON 6, TEXAS

William M. Barret, Inc.
Consulting Geophysicists
Specializing in Magnetic Surveys
Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique
GIDDENS-LANE BUILDING
SHREVEPORT, LOUISIANA

BATES AND GLENN
Meteorological Engineers
Specializing in Meteorological and Oceanographic Problems in Offshore Exploration and Drilling.
D-4732 Homer Ave., SE, Washington, D. C.

THE FORT WORTH LABORATORIES
Analysis of oil field brines, cores, gas, oil and minerals. Field gas testing. R. H. Fash, Vice President; Long Distance 138. 823½ Monroe Street, Fort Worth, Texas.

HOUSTON LABORATORIES
Analytical and Consulting Chemist
Podbielniak Gas Analysis
Oil Field Brines, Waters and Cores
Complete Evaluation of Crude Oils
Long Distance 267 Box 132, Houston, Tex.

MAGNETOMETER REPAIRS
The Robertson Company
5022 Ennis Street H-4306
HOUSTON 4, TEXAS

Factory Facilities
for production line method of PICKLING, and the application of AMERCOAT Vinyl Baked Phenolic linings in DRILL PIPE, SALT WATER and CONDENSATE PIPE.
Consult us for rates applicable to all producing areas. Lowered in-transit service rates. Also field service for coating and lining tanks and pipe.
Nowery J. Smith Company
GALVANIZING—AMERCOAT PLASTIC COATINGS—PLATING—STEEL WHSE. STOCKS
Taylor 6111 P. O. Box 7398
Houston 8, Texas

Standco NO-SMOKE
STANDCO BRAKE LINING
Stands the gaff and gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.
Standco Brake Lining Co.
HOUSTON

Have You Checked
The Trading Post?
Turn Back to Page 80